

electrical contracting

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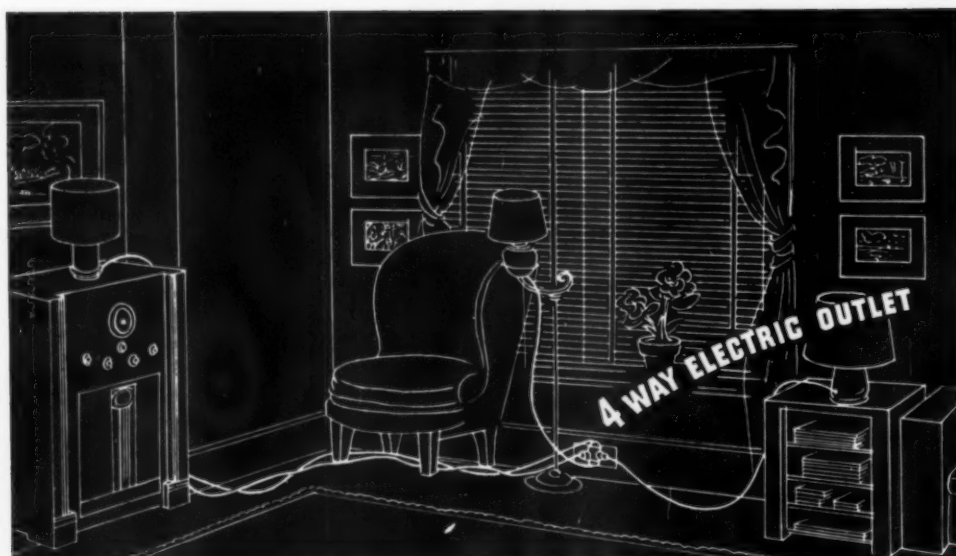
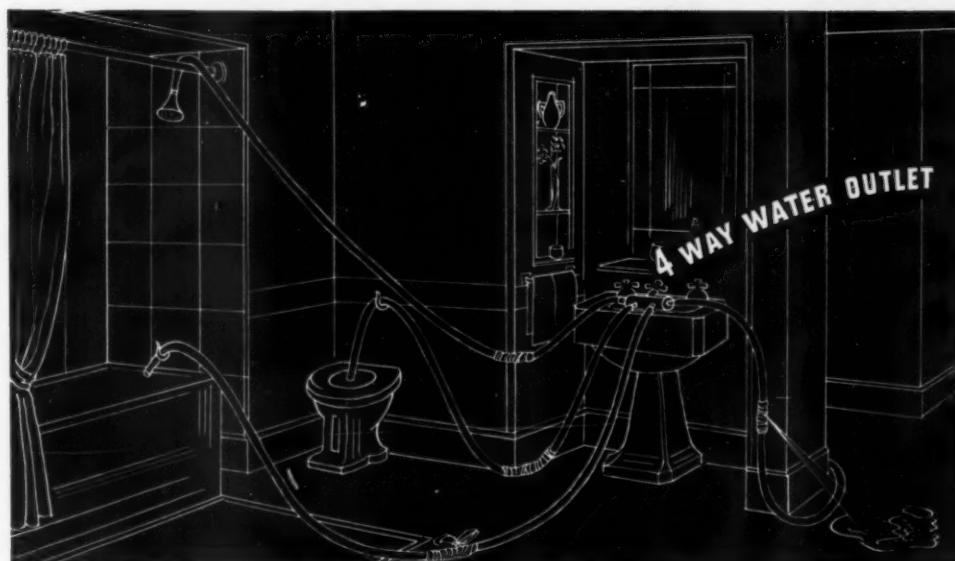
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Copper Cow Paths

JULIUS CAESAR, BOSS MAN IN GAUL, sent messages to Rome. In his camp on the banks of the Seine, he wrote his letter on a wax tablet. A courier took it and rode across France, over the Alps, down the Italian peninsula. Relays of horses, fresh riders, galloped on.

EIGHTEEN HUNDRED YEARS LATER Napoleon conquered Italy. He too sent messages from Paris to Rome. A horseman still galloped through the night over the same route. There was no better way. Communication had not changed in eighteen centuries. No one expected it to.

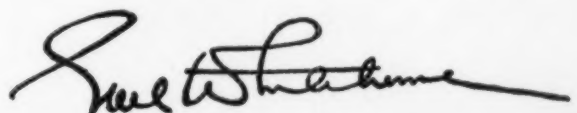
IN 1890 I BEGAN TO RIDE A PONY on the roads of Jersey. In 1900, in 1910, I was still trotting over the same macadam, the same clay. Highways between the towns, out through the farms, remained almost unaltered. Nothing had happened to our roads either. No one expected it to.

THEN EVERYTHING CHANGED. Motor cars came crowding down the pikes and lanes, found them no longer adequate. So for twenty years, we have been feverishly widening old thoroughfares and reaching out in all directions with new concrete highways.

THE SAME SPECTACULAR REVOLUTION is now coming on the roads traveled by electricity. For the wiring in homes, stores and factories has not changed with the times. Built to serve a few small lights, it has taken on the increased traffic of larger and larger lamps and innumerable new uses. Then suddenly more and more appliances have come crowding down these highways of copper. We find them too narrow and too few.

MOST PEOPLE STILL FAIL to realize this urgent need. They are accustomed to these old roads. They too expect no change in them. But here are new conditions that will not be denied. Habit must give way. Vigorous new measures must be taken that will give prompt relief and provide for heavier loads ahead.

ALL THIS BRINGS RICH OPPORTUNITY to electrical contractors. But nothing has been done about it. For contractors too are used to the old roads. Now the Devil drives and the way to market is being blocked. We must rebuild these copper cow paths at once—for modern traffic. If we do not, we will be brushed aside and other men will act.



Adequate Stocks



for Adequate Wiring

All branches of the Electrical Industry are cooperating in a tremendous drive to show America how adequate wiring "serves and saves." Millions of wiring prospects will be reached by the National Adequate Wiring Program.

You will benefit if you are ready!
Adequate stocks are a vitally important ne-

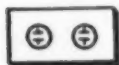


cessity in providing adequate wiring. Graybar makes these stocks—every electrical product for every electrical need—readily available to Electrical Contractors everywhere.

You'll find a nearby Graybar warehouse ready and equipped to serve you completely ... conveniently. Use it! Make it your Adequate Wiring supplies headquarters!



WIRE & CONDUIT



WIRING DEVICES

Everything electrical for
all types of Contracting

GraybaR



HAND TOOLS



TAPE

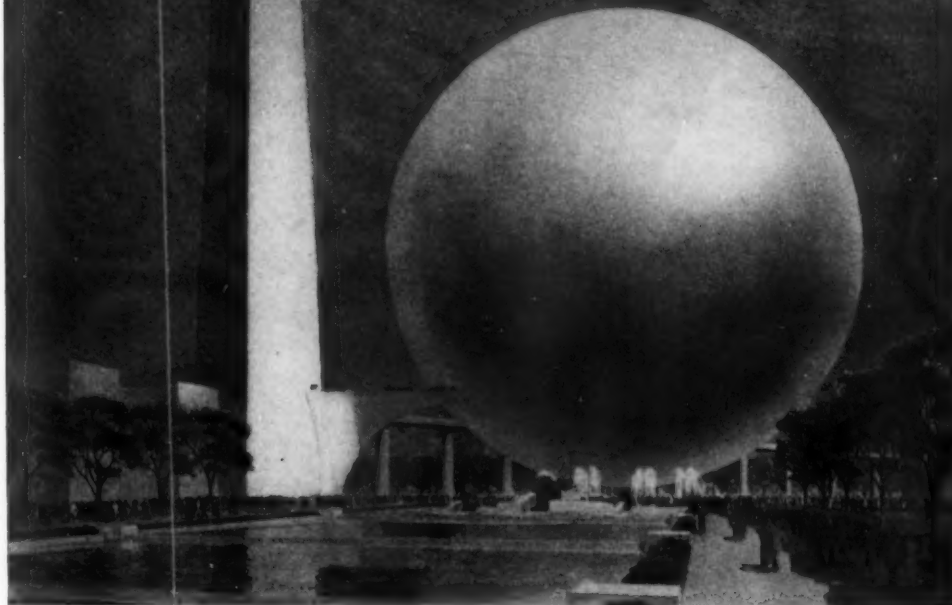


VENTILATION

OFFICES IN 85 PRINCIPAL CITIES • EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

WORLD'S FAIR HIGHLIGHTS

Site —	Flushing Meadow Park, Long Island
Opening Date	April 30, 1939
Probable Cost of Improvements	\$150,000,000
Estimated attendance	50,000,000
Estimated Crowd for one day	800,000
Number of Buildings planned	300
Number of permanent buildings	9
Estimated Electrical Load	65,000 kw
Electrical Ducts	15 miles



KEY BUILDINGS of the Fair. The 700-ft Trylon is a beacon and broadcasting tower. The 200-ft Perisphere, within which visitors may view the world of tomorrow, will appear to be poised on jets of water emitted by fountains.

Wiring the World's Fair

BIG things are taking place in the Flushing Meadows of New York, as plans produced by hundreds of engineers are taking final form. They are filling in a gigantic jig saw puzzle of huge structures, parkways, traffic arteries and man-made lakes, to transform 1216 acres of a Long Island tidal marsh into a blaze of glory.

This is where the New York World's Fair is to open on April 30, 1939. Here within sight of Manhattan's skyscrapers, electrical workers employed by various electrical contractors have begun to coordinate a maze of electrical ingenuity in time for the opening.

For the electrical features will draw upon all that has gone before in other great expositions. There will also be innovations in decorative lighting and

Engineers lift a dump to glory for the \$150,000,000 New York's Exposition of 1939. A preview of the electrical work involved.

panorama, air conditioning, protective signalling, mass communications and entertainment to aid in presenting the most recent developments of an electrical age. And it will all be so fitted into this 1216-acre wonderland that a \$2,000,000 underground transmission system is required for the estimated load, adequate for St. Paul or Dallas.

Electrical work began early in 1936, when great floodlight towers were in-

stalled for the night and day operations of power shovels, clamshells and truck caravans engaged in preparing this vast dump-heaped area for this huge construction program. Next came construction of the \$740,000 Administration Building. Today more than 700 workers of the planning and administrative staff are housed in this building.

New Fair buildings are now getting under way daily, and various electrical contractors are already at work. State and city structures are going up as private lettings are also being announced for the first of many privately-built exhibit structures. About \$10,000,000 in improvements to underground utility systems are nearing completion. This work includes street lighting, telephone conduits and other electrical services.



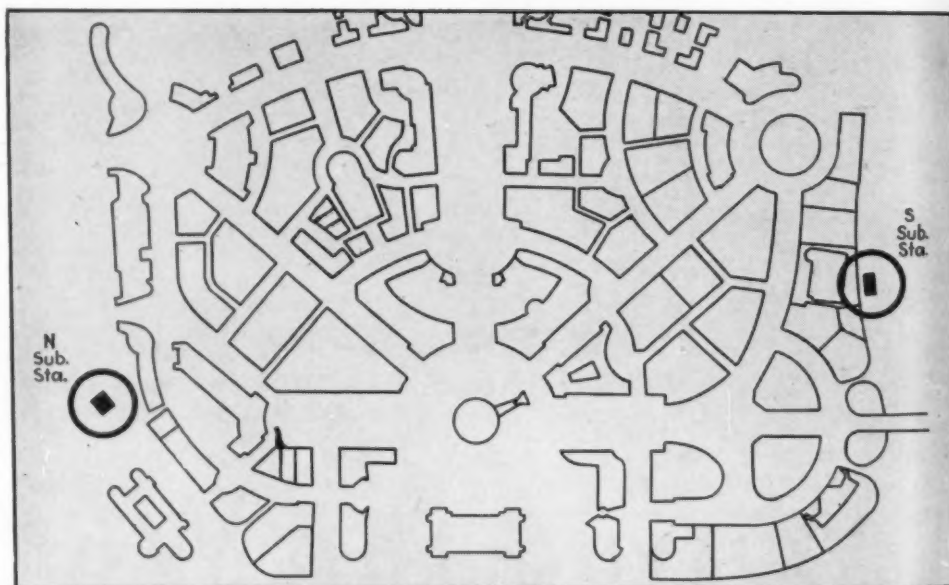
CONSTRUCTION PROGRESSES on the first of the Fair's 300 buildings while Trylon and Perisphere foundations take form. A peak crew of 30,000 workmen is predicted for this summer.

But the big push is yet to come—Federal buildings, space for the various states and territories, quarters for exhibits of some 63 foreign nations. Already 161 contracts are announced for industry exhibits, and a 280-acre space has been reserved for buildings comprising the amusement zone. Building this World of Tomorrow—the theme of the Exposition—is estimated to cost \$150,000,000 or more.

In addition to all this, the city is rushing work on elevated and subway connections. Tunnels under the Hudson and East Rivers are in process. Another \$18,000,000 bridge across Long Island Sound is progressing. Improvements to nearby North Beach Airport call for a \$15,000,000 outlay. It all means big electrical jobs during the next twelve months. Some contractors estimate that the electrical work will range from 10 to 15 per cent of the total cost. This means upwards of \$10,000,000 for wiring and equipment.

Here are some of the electrical contracts that have been let up to this time—

1. Underground conduit system for lights, power and telephones—Hatzel & Buehler, Inc., Approx. \$109,000.
 2. Administration Building—H. Z. Altberg Inc., \$22,000
 3. Communications Building—Hatzel & Buehler, Inc., \$17,000
 4. City Exhibit Building—H. Z. Altberg, Inc., \$75,000
 5. Shelter Building—Brown Electric Co., \$10,000
 6. Production Building—Brown Electric Co., \$10,000
 7. Permanent Utility Building—Walter E. Knapp & Co., \$3,000
 8. Business Administration Building—Ober, Blumberg & Bleyer, \$13,500
- Some of these contracts cover only the



DUAL SERVICE—Central portion of the 4150-volt network system showing manholes for connecting local transformers to feeders routed from the 27,000-volt North and South substations (circled).

skeleton interior wiring. Large amounts of work will follow for small exhibit and concession spaces.

But contracts awarded so far are in no way indicative of those ahead. Bids are now being revised for the State Amphitheatre, involving about \$400,000 for electrical work. It is expected that some of the buildings for major exhibitors will have electrical jobs running into even larger amounts.

Union building trades are being employed at the Fair, with the electrical workers receiving \$2 per hour. Some estimates place the total construction

labor figure at 35 per cent of the total cost. This would indicate an exposition payroll of over \$50,000,000 for the building trades. Although a tremendous force will be required toward the finish, IBEW officials predict there will be no shortage of local mechanics.

The major work of electrical contractors started with installing 27,000-volt North and South substations, each comprising one 15,000 kva and three 10,000 kva transformers. These stations when completed will supply a 4,150-volt underground network distribution system. The 27-kv feeders are energized from Hamilton Street and Hell Gate power stations of the Consolidated Edison Company.

For the underground feeders and telephone cables, a network of about 150,000 ft. of pre-cast reinforced concrete pipe and 110,000 ft. of wood conduit is being installed in conjunction with 185 manholes. Most of the manholes are pre-cast concrete, for delivery to the site ready for lowering into place.

The various 4,150-volt transformer

stations, which are to serve the Fair buildings, will be connected by taps extended from splices made in the manholes. Present plans call for most of the transformers to be placed outside of temporary buildings, to lower hazard.

The Fair Corporation is letting some of its own electrical contracts, while for certain buildings the general contractors sublet all mechanical work. Electrical contractors are required to pre-qualify to be eligible as bidders for Fair Corporation projects. Those firms who have been placed on the qualified bidder list, were chosen from evidence

submitted covering their past experience and performance. Each project is completely laid out and specified to cover the anticipated requirements.

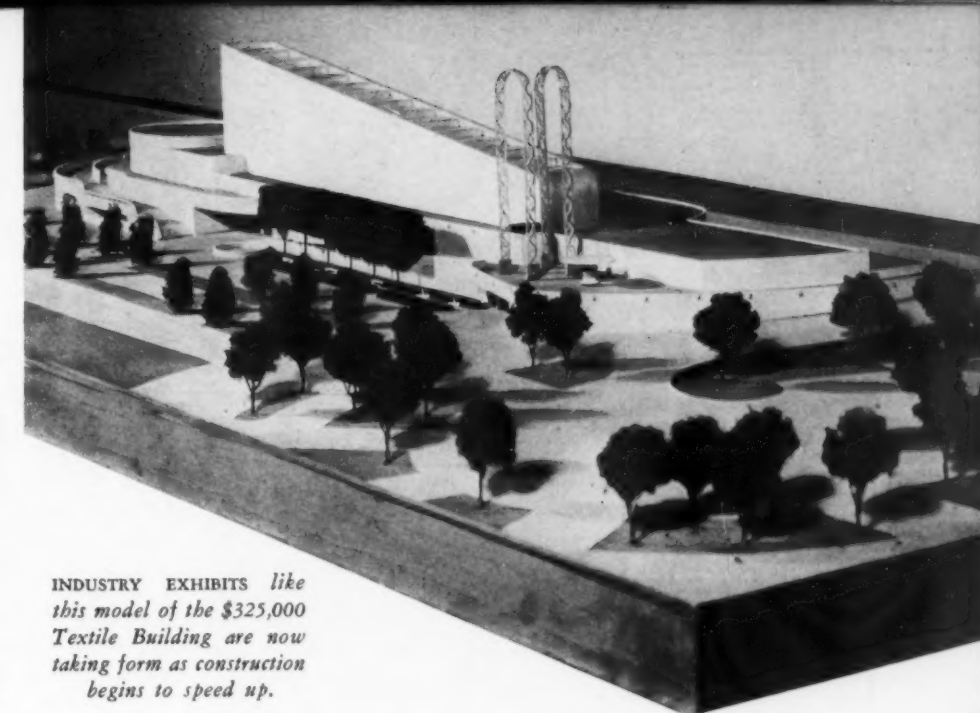
Buildings for private exhibitors are being designed by outside architects and engineers of the exhibitor's own choosing. While such designs are subject to approval by the Fair Corporation, the letting of contracts is handled privately.

All of the Fair's electrical work is being inspected by the New York Board of Fire Underwriters for compliance with the National Electrical Code. A separate World's Fair Building Code covers all general construction. This code was developed in harmony with basic stipulations of the New York City Building Code.

The Fair will comprise about 300 permanent and temporary structures, and almost every approved method for installing electrical work will be employed. Temporary structures are designed to be reasonably in cost.

Here rigid conduit will be employed for the exposed wiring to exhibitors motorized machinery and to most of the concealed feeders. But open loop feeders are used in attic spaces, consisting of slow burning wire, usually located near a catwalk. Branch circuit wiring consists largely of conduit and armored cable. In some cases non-metallic sheathed cable will be used. The low-tension conductors for the temporary Administration Building were laid on the concrete floor between sleepers to which the finished floor was fastened.

Because many of the final lighting loads for exhibitors cannot be definitely determined, feeder and circuit capacities are usually calculated for a demand of 5 watts per square foot. Motors and heavy loads for cooking and other electrically heated devices, will need special treatment for individual exhibitors. Local transformers at each larger building



INDUSTRY EXHIBITS like this model of the \$325,000 Textile Building are now taking form as construction begins to speed up.

will provide leeway for handling these heavy demands.

About \$50,000,000 is estimated to cover permanent improvements which include a number of city and state buildings. Here the materials and equipment are being carefully selected for lasting service.

The Exposition's big electrical jobs will include: floodlighting of thousands of trees and flower beds with mercury vapor units; street lights; illuminated fountains; spectacular lighting of structures, sculpture, pylons and the Theme Trylon and Perisphere. Air conditioning systems will be provided in most of the large exhibits, and special motor-driven machinery. Many small theatres and the maze of eating places, concessions and small exhibits will require individual decorative effects.

The Fair's telephone system employs a separate "World's Fair Exchange". There will be an extensive public address system, totalization devices for

counting visitors at various entrances and a central fire alarm system.

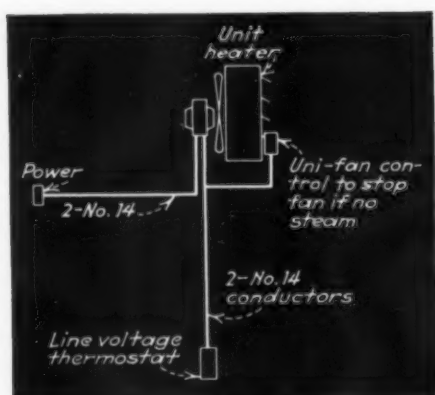
Here then the coming months will reveal a rapid acceleration in mass construction operations. Competition for the fair's electrical work being keen, it is expected that interesting installation methods will develop as the various electrical contractors and their crews get organized for this type of work. Every one will be pressing for the great moment when, in the words of the publicity releases—

"A shadowless dusk descends on Theme Plaza. It is opening day of the Exposition. More than 800,000 visitors have stormed the gates. A switch closes, the Fair bursts into flame, quivers with light, dances to every band in the spectrum. The New York World's Fair of 1939 has opened." And again the coordinated activity of skilled contractors and workers will have made possible a gigantic electrical spectacle for another great exposition.

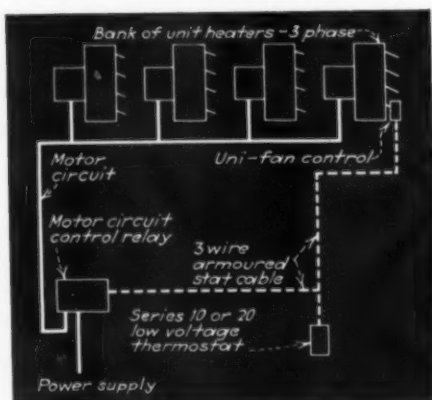
FAIR HEADQUARTERS for 700 specialized workers. This \$740,000 air conditioned Administration building includes examples of modern equipment which will make big jobs of other Exposition buildings for many electrical contractors.



Wiring for TEMPERATURE

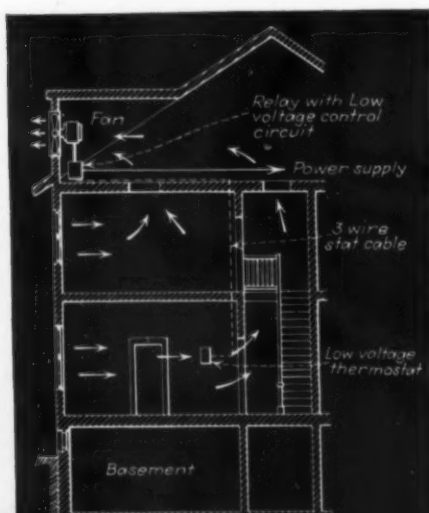


UNIT HEATER wiring connections for single units.



GROUP CONTROL for unit heaters requires a relay in the circuit supplying several motors.

ATTIC FANS may employ several convenient control features.



WITH the rapid growth of the air conditioning industry, the electrical contractor's attention is drawn more and more forcibly to the volume of work offered in that field. Power supply for primary equipment represents a large and profitable market. Moreover conditioning equipment must be controlled to maintain proper temperatures and humidities under varying load conditions. And when electrical temperature controls are used, there is still more opportunity for the contractor.

There are a vast number of different controls that may be used in the solution of given control problems. Here are a few of the more common circuits that the contractor meets, either in the design of new systems or in the installation of equipment furnished by other trades.

Unit Heater Control—In the simplest circuit application, single unit heaters may be controlled by individual thermostats of the direct line voltage type. A "uni-fan control" is frequently used, wired in series with the thermostat, to prevent the fan from running unless there is heat in the core of the unit.

Where a bank of unit heaters are controlled from one point, the motor circuits are usually controlled through a relay with a low voltage control circuit. Three phase motors and currents too large for a thermostat may be handled in this way. Low voltage thermostats and uni-fan controls may then be used with the relay to reduce the cost.

In another method of operating groups of unit heaters, the thermostat operates a valve in the steam line to control the supply to the units. The fans then operate directly from the uni-fan control when steam is on.

Attic Ventilation—There are three desirable control features to keep in mind on such systems:

1—Provisions for operating the fan from a convenient location.

2—A thermostat should cut off the

Electric temperature controls have become an essential part of modern wiring jobs. Here are a few useful control circuits that every contractor should know about.

fan when the temperature drops below a predetermined point.

3—The fan should be set to run during a certain period of time and shut off.

Thermostats are available to accomplish all three functions. This involves a comparatively simple control circuit consisting of a low voltage relay at the fan location and a remote control switch and thermostat at a convenient point.

Domestic Heating Control—In the accompanying diagrams, the common domestic control circuits are shown. Here an automatic control is applied to a hand-fired warm air furnace with forced air circulation equipment. In this circuit a low voltage thermostat operates a relay to energize the damper control. The circulation fan is in turn operated by the furnace control, when the air within the bonnet rises. When the room thermostat is satisfied the drafter closes and the fan stops. In case of excessive bonnet temperature, the fan starts automatically.

It is essential with any type of automatic heating system that some form of safety control be provided to limit the operation of the heating plant to its safe capacity. A warm air furnace should have a furnacestat or similar device, a hot water plant should have an aquastat, and a steam boiler, a pressure and low water cutoff.

Year Round Air Conditioning—This type of control circuit is more complex than the heating plant control alone. A typical plant will consist of a hot water boiler, air circulating fan, humidifier

By James S. Locke
Minneapolis-Honeywell Regulator Company

CONTROL

and a source of cold water. The primary controls will consist of a summer-winter switch, a winter thermostat, a summer thermostat and a humidity control.

In winter operation, the hot water heating plant is operated by an immersion aquastat, which holds the water temperature within a 10 degree differential. As heat is required, the thermostat operates the water circulation pump and air circulation fan through a relay. The humidifier circuit is so connected that when the fan motor is running, the humidity controller can operate a solenoid valve, admitting water to the spray, as required to maintain the correct humidity.

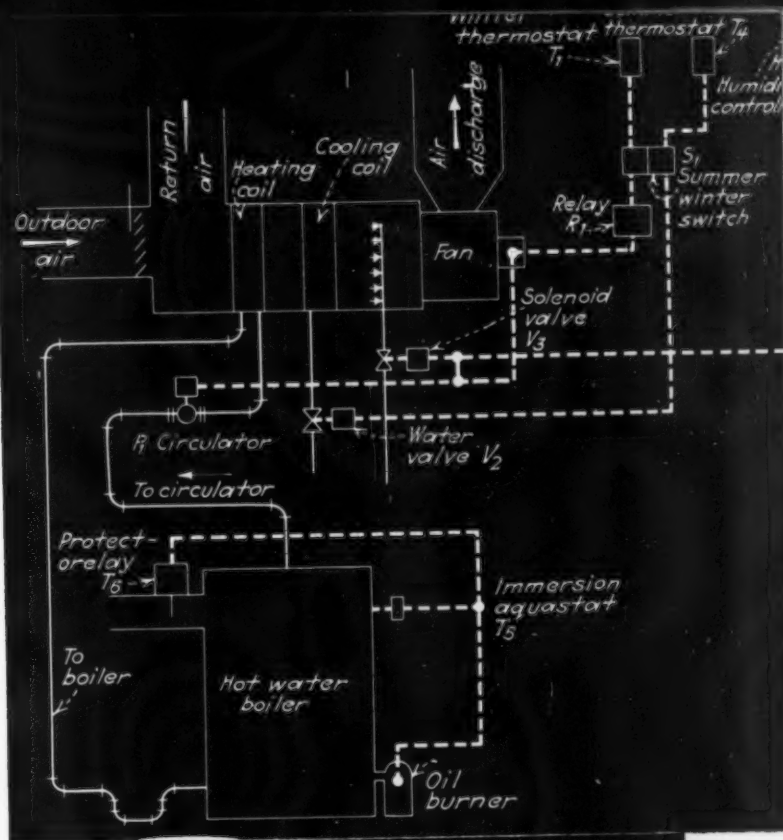
With operation of the summer-winter switch to the summer position, the cold water supply valve is placed under the control of the summer thermostat, the humidity control disconnected, and the hot water circulator circuit opened. As the room temperature rises, the thermostat opens the cold water supply valve. The air circulating fan operates continuously on summer control.

The basic control problem will be much the same for similar systems using steam or warm air for heating, and using stoker or gas burners in place of the oil burner. Ice bunkers or compressor cooling may also be used where a cold water supply is impractical.

Wiring for Control—Control circuit diagrams often appear highly complicated. The wiring is, in fact, simple and not as bad as the diagram looks at first glance. All control instruments are color coded and in general each control function takes a two or three wire cable. If a wire or two are reversed, usually the worst thing that happens is a reverse operating damper or something equally simple. No dead shorts result.

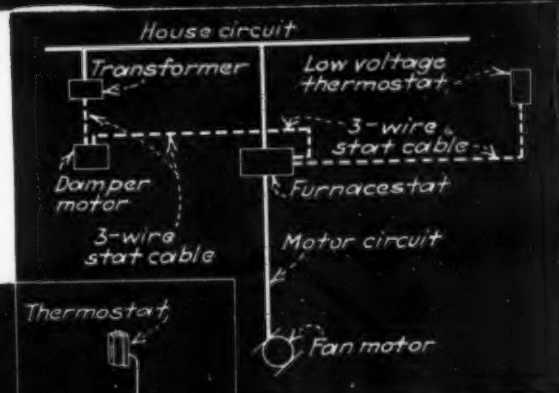
There is no reason why control wiring should be such a mystery to many electrical contractors. For when this mystery is removed by familiarity, they will find it a profitable field.

Electrical Contracting, March 1938

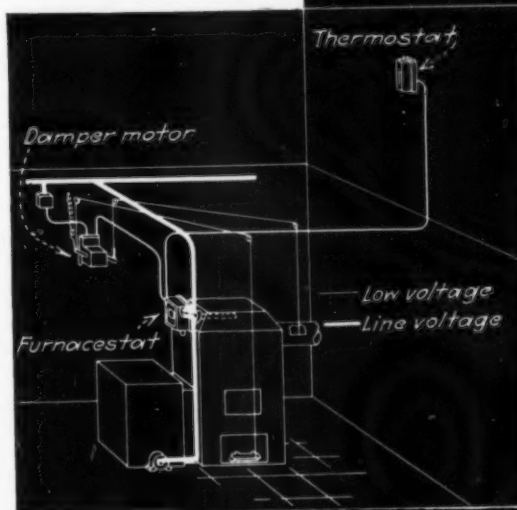


YEAR-ROUND DOMESTIC air conditioning systems usually employ these control devices.

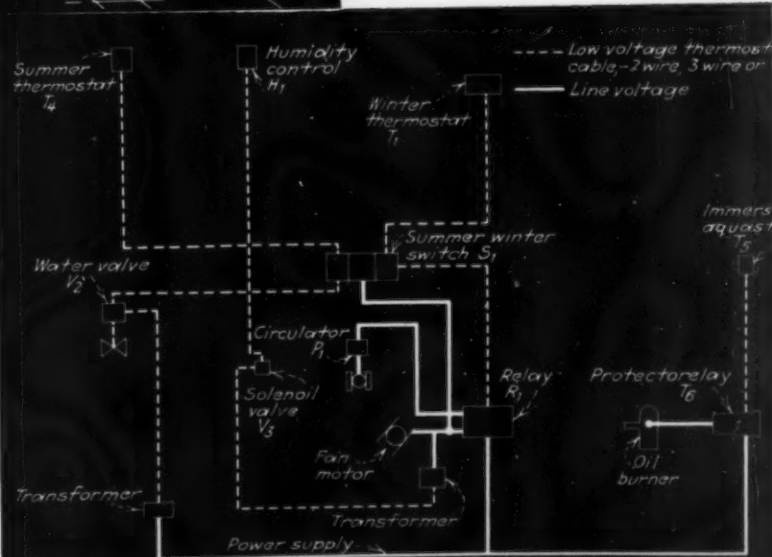
DOMESTIC HEATING PLANTS lend themselves to worthwhile devices that require wiring.

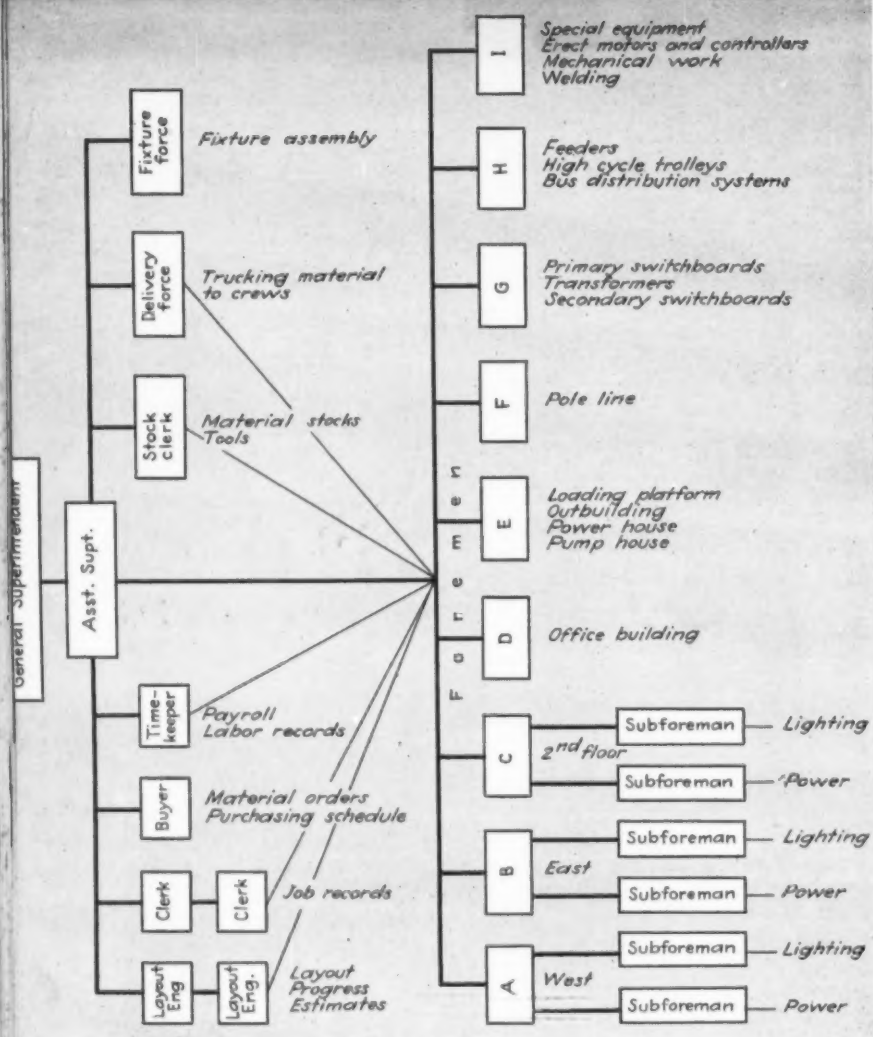


RISER DIAGRAM OF CONTROLS for a warm air installation which has forced draft.



RISER DIAGRAMS for the control of year-round systems (shown at top right) clear some of the mystery of modern electrical controls.





ORGANIZED FOR ACTION—A diagram of the electrical contractor's field staff on a New Jersey automobile assembly plant.

telephone system was installed between the stockroom and five convenient points about the 26 acres of job territory. Orders, telephoned in, were made out on standard triplicate forms. The material was sent out immediately by truck and a copy of the order filed in the foreman's order box for checking each night.

The project was divided into nine parts with a foreman in charge of each. The office building, a separate, two story structure, connected to the main building, was wired completely by one crew. Outbuildings, power house, pump house, and loading platform, were handled by another. The pole line, with the high tension service of twelve 250,000 CM conductors, was brought from the utility station to the building by a separate line crew.

Wiring the main assembly plant was divided between five foremen and their crews. Of these, three were further subdivided into two groups, one for lighting work, the other for power. The main building was handled in three sections; from the west wall to the center, from the center to the east wall, and the second floor. A fourth crew installed all lighting and power feeders, bus distributions systems for the welding equipment, and the high cycle trolleys for the high speed machine tools. The service equipment, high tension switchboard, power, lighting, and welding transformers, and the secondary switchboards, with all interconnecting bus work, were installed on the roof of the building by the fifth crew.

Each of the conduit and wire crews took a section, working from west to east. A corps of electricians, welders, and millwrights followed the power wiring gang; mounting motors, controllers, hanging welding machines, lining up equipment and making the final connections.

To assure smooth functioning of this large organization, frequent conferences were held by the foreman, the layout men, and the superintendent. In these conferences, the work was coordinated and the mechanics re-distributed to keep the job balanced, and avoid delay, due to undermanned crews, on any part of the work. Through these conferences, each foreman knew where his work ended and where the other crews took it over, and the amount of work needed from his crew to meet the scheduled finishing date.

Organizing A Big Job

How A Half Million Dollar Industrial Installation Was Planned And Operated To Finish In Five Months

A HALF MILLION dollar electric contract was recently executed by Fishbach and Moore, of New York City. It was the General Motors Company's new assembly plant at Linden, New Jersey. It demonstrates how the electrical contractor can apply the organization methods of mass production industries to his good advantage.

Careful organization in advance of the starting date was needed to meet the schedule. All details were handled

in a complete local job office under the direction of the general superintendent. An assistant superintendent and two layout engineers prepared progress schedules, layouts and estimates. A buyer purchased all materials. Two clerks and a timekeeper took care of records and the payroll for a force that numbered 250 men, at the peak.

Adjoining the job office, a complete stockroom was maintained with a storekeeper in charge. Two delivery trucks and a "bull gang" of five men, kept the crews supplied with materials from the stockroom. Hand tools were checked in and out, with a brass check numbering system and a peg board, showing the distribution of tools to each foreman.

To speed up material delivery to the working crews, an intercommunicating

Twin Cities Light Ball Parks

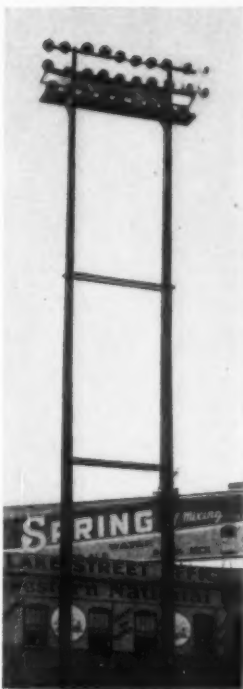
NIGHT baseball arrived to greet thousands of cheering fans last season in Minneapolis and St. Paul. Both Nicolett Field, in Minneapolis, and Lexington Park, in St. Paul, were equipped with high intensity floodlighting systems, under the direction of R. J. Swackhamer, baseball lighting engineer for General Electric.

The installation at Nicollet Field was made by the Sterling Electric Construction Company of Minneapolis. Eight towers were equipped with a total of 230 reflectors, each 1500 watts.

Four fabricated steel towers, rising 68 feet above the grandstand roof, carry the infield lighting units. Four towers, made up of two 105 foot wood poles and 4 inch angle crossarms, take care of the outfield lighting. Reflectors are mounted in rows at the top of the towers, spaced two feet horizontally and three feet vertically. A platform, built



INFIELD LIGHTS—On steel towers over the grandstand, are fed from transformers mounted in the center of each tower. A high tension circuit distributes at 4150 volts.



TWIN POLES—At the back fence support the outfield lighting units. Flexible leads from each reflector terminate in a long, horizontally mounted panel behind the center row.

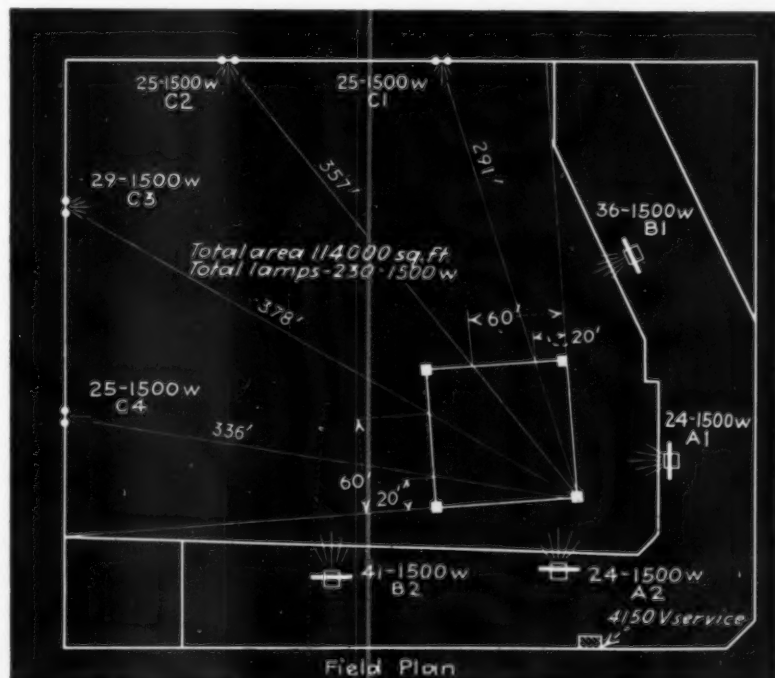
behind the reflector supporting frames, permits focusing and relamping.

A 400 kw. service at 4150 volts is distributed to two circuits, through manually operated oil circuit breakers. One line of three No. 6 varnished cambric insulated wires, in electric metallic tubing, is run to the four towers above the grandstand. The other line is extended beyond the stands to the outfield towers with weatherproof wires on insulators. The high tension circuits end at transformers on each tower.

Six 37½ kva. and two 75 kva. transformers, mounted below the banks of reflectors, provide 132 volts on the secondary feeders to the tower distribution panels. Flexible asbestos leads from each floodlighting unit terminate at individual fuses, in a specially constructed panel the width of the platform.

In all, 102 concentrating and 128 diffusing type reflectors, with 1500 watt lamps, operated at 10 per cent over-voltage, provide a total of 10,246,500 lamp lumens, of which approximately 55 per cent is available on the playing field. Each reflector is individually focused and set according to a predetermined field layout to provide a perfect distribution over the playing area.

A similar installation with the same number of units was installed at the St. Paul field. These two projects complete the illumination of the American Association parks.



FIELD PLAN—Showing the tower locations and the distribution of the reflectors.

NOW . . . Sell Wiring!

A GREAT DAY!

For the first time, the electrical industry has turned its attention to wiring. It is a great day for the contractor.

All these years only the contractor has worried about wiring. The manufacturers have been thinking about their own products, and the wholesalers about their lines. The power companies have been busy about light and appliances. Wiring has been forgotten.

Now tight wires pinch all electrical wiring. And the industry has waked up. Something is being done about it. It is a great day for you!

LONG and eagerly awaited—the National Adequate Wiring Program is ready. Beyond question it is the most impressive, appealing, and constructive step, yet taken, to make wiring salable—to get it sold.

The program provides a complete equipment. With it electrical men in any community can organize a wiring campaign. It is clean cut. It tells you what to do and how to do it. It furnishes not only advertising materials and a certification set up, but a definite purpose, a practical procedure. You can now raise the banner and take the town.

Here is what the National Adequate Wiring Program offers—

1. *A General Plan*—the basis of the national program, into which every city can tie its local program, no matter what local conditions may be.

2. *A Selling Equipment*—complete and balanced—ideas and materials to arouse the interest of all classes of electrical men, architects, builders, the public.

3. *An Advertising Campaign* of the most appealing booklets, folders, posters and display cards ever prepared for a national movement in this industry. It includes—

- An emblem and slogan
- Twelve direct mail folders
- Newspaper advertising mats
- A pictorial primer
- A sound slide film
- A chart for speakers
- A check-your-wiring folder
- An architects handbook
- A display poster
- A pay roll stuffer for electrical workers
- Three bulletin board posters

4. *A Simple Certification Plan* for any city that has no Red Seal or other program

Announcing the Splendid Program of the National Adequate Wiring Campaign

working. This is complete with certificate, home identification poster and other well designed material.

And behind all this, of course, the National Adequate Wiring Bureau, is at work, sponsored by the four National Associations—NEMA, NECA, NEWA, EEI and the leagues. NEMA has put up the funds. W. E. Sprackling, vice-president, Anaconda Wire & Cable Company, is chairman of the National Bureau, representing NEMA. Herbert Metz, sales promotion manager of Graybar Electric Company, heads the Plan Committee, representing NEWA. E. A. Brand, engineer, Niagara and Eastern Power Corporation, is chairman of the Specifications Committee, representing EEI. A splendid group of men from all branches of the industry makes up the Bureau Executive Committee.

Local Adequate Wiring Bureaus, will be set up all over the country. The National Bureau from its headquarters at the NEMA office in New York, will keep men in the field to help local cam-

paings. An extensive news service to the industry and popular press, has already reached a reading audience of more than 16,000,000.

They are getting the wiring idea tied into all other promotion programs that are running in the industry—a most important job. They are working with architects, builders, government agencies, banks, insurance companies, real estate boards, women's and men's clubs, retail dealers. They are getting companies in all branches of the electrical industry to sell the adequate wiring idea to all their employees—a clever touch.

In short, this is something new under our sun. It is the kind of a campaign that put electric refrigeration over—that has put over Better Light-Better Sight. And this program benefits by their experience and lifts the standard of the material higher. It can be used to sell both old houses and new houses. But above all else, it is a program for Your Town and for You.

WELL DONE—This window display is typical of the appealing art and forceful copy that makes the Adequate Wiring Campaign notable. Throughout the balanced assortment of advertising material (See opposite page) the message is strong, direct, pleasing.



The NATIONAL ADEQUATE WIRING PROGRAM



THIS IS TO CERTIFY



Name of Bureau
at Headquarters
in the City of

THAT the home of
in Adequate Wiring
THAT an adequate wiring installation, designed to make possible a full measure of safety, convenience, economy and through electrical service, has been provided through compliance with the approved by the NATIONAL ADEQUATE WIRING PROGRAM
THAT a representative of the organization has inspected wiring installation, and home at the organization Certified Adequate Wiring

ARCHITECTS' SPECIFICATION ADEQUATE HOME WIRING

Know it!
Talk it!
Sell it!

ADEQUATE WIRING is the LIFE BLOOD OF THE ELECTRICAL INDUSTRY



Behind THE OUTLET

You Need Adequate Wiring

THE BIG BAD WORD SAID A MOUTHFUL

OH, GRANDMOTHER. NO OUTLETS FOR WHAT INADEQUATE WIRING YOU HAVE

ALL THE BETTER TO INCONVENIENCE YOU MY DEAR



Check YOUR WIRING

Check YOUR WIRING

Check YOUR WIRING

Check YOUR WIRING

Check YOUR WIRING

Check YOUR WIRING

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Check YOUR WIRING

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Check YOUR WIRING

Check YOUR WIRING

Check YOUR WIRING

MODERNIZED

Helps our Bu

and YOUR

Know it!

Talk it!

Sell it!

ADEQUATE WIRING RELATED TO LIGHTING, APPLIANCES, FURNITURE

- CEILING LIGHT
- BRACKET LIGHT
- SWITCH CONTROLLING LIGHT FROM ONE LOCATION
- ONE OF TWO SWITCHES CONTROLLING SAME LIGHT
- WALL SWITCH WITH PILOT INDICATES SWITCH CONTROL OF LIGHTS
- DUPLEX CONVENIENCE OUTLET
- COMBINATION RADIO AND CONVENIENCE OUTLET
- SPECIAL PURPOSE OUTLET

Explanatory symbols that are furnished to the system? See the list of symbols at the end of the book. It takes a lot of time to find out what the symbols mean. It takes a lot of time to find out what the symbols mean. It takes a lot of time to find out what the symbols mean.

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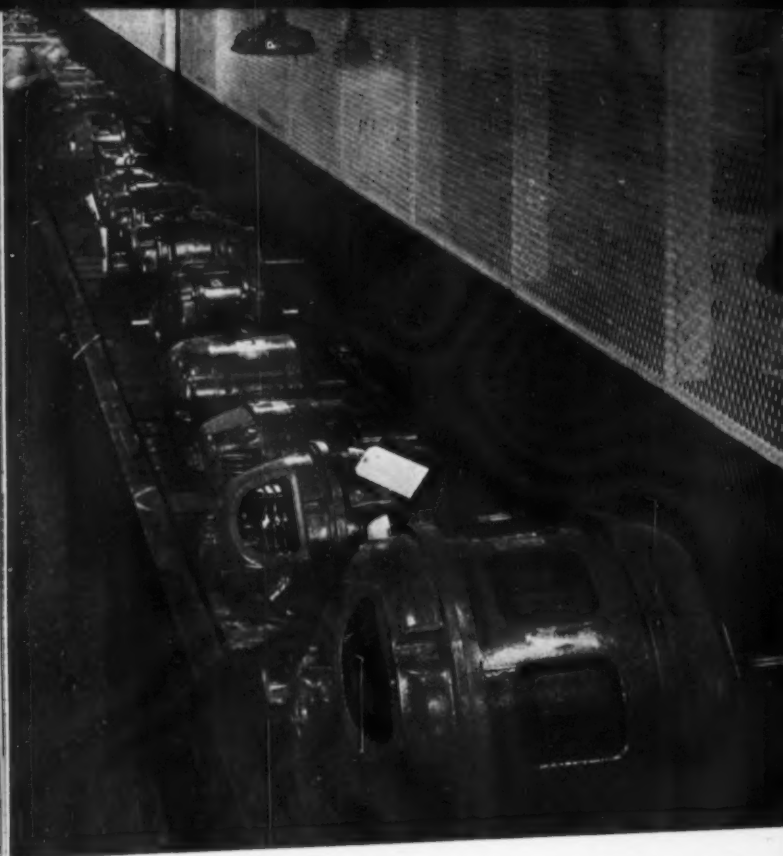
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POWER CONVEYORS take completed motors past the station, where name plates are attached, and on to the crating station.



MASS PRODUCTION—A sea of new stators for industrial a.c. motors on roller conveyors await the next operation.



STATOR WINDING is a waist-high job, employing a ring-type, revolving clamp which permits easy movement of the frame, both radially and axially.

INSULATION MATERIALS are counted out, weighed and packaged in accordance with detailed requirements for specific types of stators.



IDEAS FROM M

Expanding Motor Shops Can Find Some Good Suggestions In These New Methods Used for Making Industrial Motors.

WHEN Westinghouse saw its East Pittsburgh industrial motor plant becoming inadequate to meet increased demands, a complete reconditioning program was undertaken. Today it claims to be the world's most modern motor aisle. The completed layout provides for a smooth production flow of standard and special a.c. motors rated from 1 to 50 h.p., in one area and all on one floor.

Efficient handling was a chief objective in the new layout. And as one plant executive puts it: "The best handling of any product is generally conceded to be the least handling of it." Accordingly this motor aisle has two miles of coordinated conveyor in 200,000 square feet of space. Conveyor types include gravity, roll, belt, chain, slot and live roll systems. Workmen do practically no lifting, for there are air hoists at all work stations along the production lines and they are supplemented by independent crane and hoisting facilities of various sizes and types.

So here is a plant where smooth



STROBOGLOW BALANCING machine, with a standard die-cast rotor being dynamically balanced on the shaft.



AIR HOISTS in conveyor lines. This pick-up for the continuous monorail takes stators through two dips and bakes in about 11 hours without handling.

MOTOR AISLE

manufacturing sequence has been insured. And it offers many good ideas for motor shops.

The general flow of materials and the sequence of operations is continuous from the incoming point of materials, through various manufacturing processes to warehousing and shipping areas. Flow of production is from south to north in two parallel lines, one for standard motors and one for special types. This aisle is about 1450 ft. long and 110 feet wide.

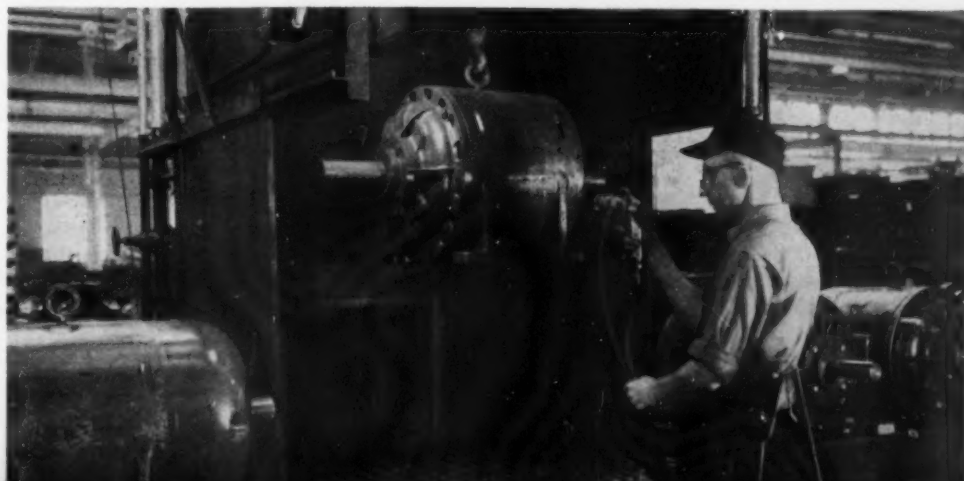
Each production line has unit manufacturing centers that supply parts by conveyor to sub-assembly and final assembly positions. Each operation has been studied to keep machinery and workmen gainfully employed. Also it keeps all pieces moving along the line at the proper working height and easy to work on.

While motor service shops do not require certain equipment used in manufacturing motors, the facilities for effortless handling of parts, for the smooth flow of production, and the modern equipment provided at various production stations will prove of interest. Selected views of some of these operations are shown.



FINAL TESTS—Banks of test boards beside conveyor lines avoid a jam-up. By-pass conveyor in foreground carries "rejects" back for correction. (Above)

ROLLING THROUGH—Motors weighing up to 1500 pounds roll through the spray booth. Air operates chain hoist, turn table and baffle doors. (Below)



LOOKING IN ON

E. C. C.

Seventh in a Series of Informal Visits to Interesting Contractors

By Earl Whitehorne



ALL my life I have wanted to be a farmer. I still want to. But one evening last fall in Portland, Oregon, Carlson of Youngstown nearly ruined my dream. He is NECA Executive Committeeman from Ohio, Michigan, Indiana and West Virginia—Ernest C. Carlson, president of Carlson Electric Company.

We were sitting in the old Multnomah Hotel, on the way back from Los Angeles, resting after the drive up the Columbia Highway, before the fine banquet that the local industry threw for the crowd on the Convention Special. I asked Carlson how he came to go into electrical contracting. He was trying to get away from a cow. Or should I say sixty cows?

Carlson was born near Youngstown and raised on a farm out of Warren, Penn., till he was fifteen. He milked cows—first one, then as his hands grew stronger, two and three, until at the tender age of twelve he was teasing the lacteal fluid out of twelve sets of down hanging udders twice daily—and that's work.

Basic Education

It is also education. When the mean one they called the "three titter" kicked the bucket over and his lap was full of milk, it did no good to get mad. There were ten more cows waiting to deliver. And fighting cows is not good for the dairy business. So a farm teaches patience, persistence, self reliance, independence, industry, thrift, self control and other fundamental principles of life. Young Ernie Carlson learned 'em all.

When he was fifteen they moved back to Youngstown to be near a good school. But there were still sixty cow brutes—and each morning in the cold gray dawn E. C. drained fifteen of them and polished up the chores before

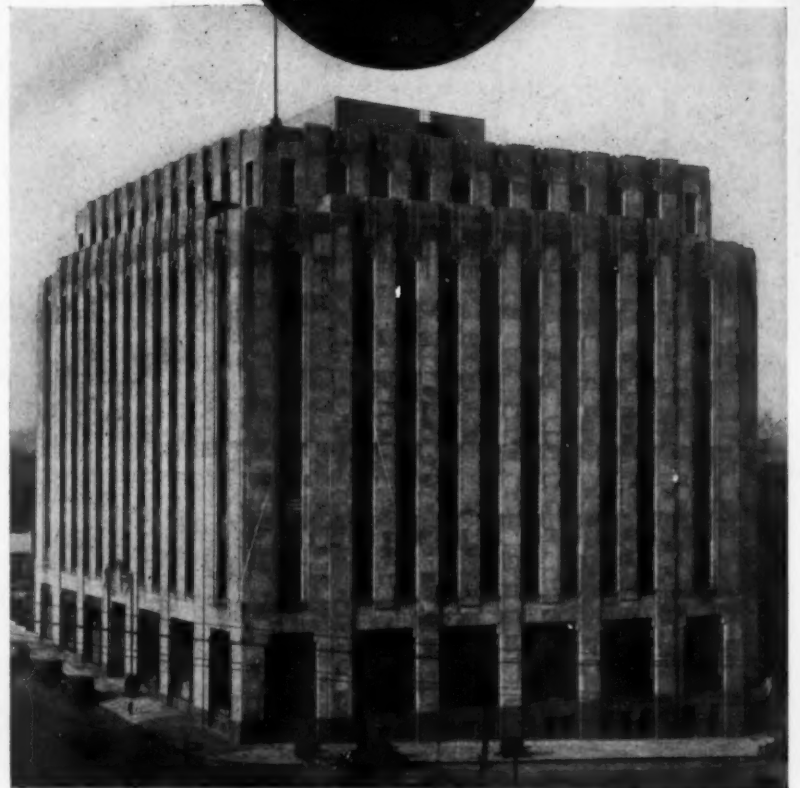
he jumped a motor cycle and burned the road 7 miles to the classroom. And study over, he burned it back again to greet his friendly cows with a glad cry.

But Ernie hated to loaf around that way, so he took on the bookkeeping for the high school, and before he graduated was racing back to town again after the evening chores to hold a job as secretary for a motorcycle and auto equipment outfit. And in his spare time he was business manager of the high school paper.

Two weeks before his graduation, some men in Youngstown organized the Adams Electric Company to take a

flier in the wiring and fixture business. Carlson's dad put a thousand dollars into the venture—a pot of money on any man's farm—to get E. C. started on a career. So Ernie was bookkeeper and inside man. Carl Peterson was the wiring superintendent. They had plenty of business but no experience and in two years folded up—with no spinach in the till.

Peterson and Carlson had sixty-five dollars between them. So they joined up—the Peterson-Carlson Electric Company—Carlson handling the business end, Peterson the mechanical. They were careful, took only house wiring—



GOOD WORK—Modern office building of the Ohio Bell Telephone Company, Akron, wired by Carlson.

C. CARLSON

both went out on the job. Carlson learned to handle tools. He did the bookkeeping at night. Their shop was in the basement of Peterson's home and they worked there Sundays.

Gradually they got ahead until they were employing four or five men. They specialized. One crew worked only on old homes, another only on new homes. Carlson saved the money he made and paid his father back. He was not responsible for the failure of the Adams enterprise, but it was through this backing that he got his start.

He Went to War

Then Carlson went to the War. He was a year in France—came out a corporal in the intelligence section. It was his stint to work his way out front by day, get the lay of the land and lead the troops forward by night. Nice quiet easy job. He was standing in a trench waiting to go over the top when the barrage quit at eleven o'clock one morning, like a tidal wave of silence. It was the armistice.

Meanwhile, Peterson had gone on, moved and built a shop. They resumed partnership. Carlson married in 1920 and Peterson went home to Sweden to visit his folks. Carlson ran the business and did a lot of work for a fixture house. They got to owing P & C too much and Carlson took 'em over, and was a retailer.

Then something interesting happened. John Kuhlmeier came to town one day. He told Carlson he was no retailer. Carlson decided he was right and held

an auction and cleaned out his retail stock, fifty cents on the dollar. Within a year, also, Carlson and Peterson dissolved partnership—still friends—and each went it alone. And in 1921, Carlson took only large scale commercial wiring. Since then he has done only commercial and industrial work.

He Moves Downtown

He moved downtown in 1930 near the power company. He employs from 45 to 65 people. He is always equipped with the best and newest tools. He is air conditioning distributor for Westinghouse in five counties. He has a thoroughly schooled air conditioning man, one in charge of engineering, a man to head the office. His brother runs the service end and is second in authority. Carlson himself does the buying.

Carlson has a system. He has not interested himself in detail work or the engineering or mechanical side. He sees electrical contracting primarily as a business and spends most of his time where the business is—meeting people, making friends, learning where work is coming and getting it. He is active in the Rotary Club, the Chamber of Commerce, the contractors association and around the country club. When a church wants some decorative lighting they call on him. He has equipment ready and puts it in and

jobbers get all his business. They know how it is divided and that he doesn't shop for bargains. If there is an extra five or ten to be had, they tell him; and on the long haul he gets a low price—plus quality—plus service.

He works it both ways—never takes advantage of a customer—has never had to sue one—makes no secrets—takes his costs and shows the customer all papers if a question comes. When one says—"Your price is too high!" Carlson's answer is—"All right, we'll do it time and material and if an extra dime shows up, it's yours." So he keeps a clean record; and when somebody around town asks about "Ernie Carlson" everybody says, "Tip, top!"

Carlson gets about the state a lot—meets other contractors, watches certain state legislation, contacts industries that are doing things. He works hard—but he takes it easy—if you know what I mean. The trip to Los Angeles was his longest period away from work since the war.

But he is steady, thoughtful, effective. He comes from a long line of Scandinavian ancestors, who lived in the presence of the irresistible forces of cold and ice and snow and wrested a living from stormy seas and a short seasoned soil. They have learned not to waste energy in frittering. E.C. is calmer than a Sunday morning in May.

He never worries—is never lonesome

CARELESS YOUTH—Ernie (at the horns) when he was learning to work on the business ends of a cow, all four of them.



CARLSON'S GANG—Here are the men who get the jobs and figure them and see them through—and run the business.

makes no charge. It brings contacts.

Carlson hires people to do the working job. He tries to keep himself free to do the thinking job. And he follows the progress of all work. He sees a daily report on every large project showing him the accumulated cost that day—a weekly report on all work in process. He delegates authority. Three

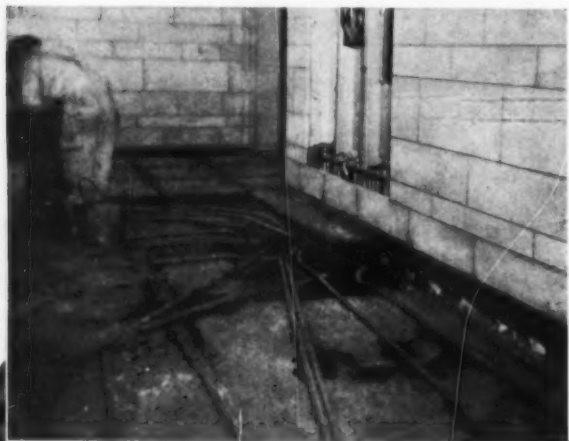
—or blue—or unduly elated or enthusiastic. He takes it as it comes.

And that is what makes me still feel all right about wanting to be a farmer. For I know damn well that I would not show up some times to milk my dozen cows. And when the three-titter kicked, I'd curse and lam her with the bucket. All this would make it fun.



BELOW

SCATTERED RUNS, as at this corridor panel, did not warrant such extensive concreting. Here heavy straps and concrete anchors were used to cinch springy runs tight to the rough floor.



RIGHT

EXPOSED CONDUITS massed on rough concrete in corridors won't stand the gaff unless they are made secure against ruthless traffic conditions.

LEFT

BUILDER'S TRAFFIC is hard on exposed runs. Here a group of corridor conduits are shown grouted in place, after they were strapped to the rough concrete floor.



Abuse

GUARDED ROUGHINS

Pittsburgh's Cathedral of Learning is a Long-time Job that Required Special Attention to Top-of-Floor Conduits.

WHEN conduit is left for several years exposed on rough concrete floor to all sorts of heavy corridor traffic, there is plenty of chance for trouble. The electrical contractor who faces this condition will save expensive mishaps by installing his work in a substantial, well-guarded manner. The Iron City Engineering Company has had such an experience.

Back in 1926 they began to wire the monumental Cathedral of Learning for the University of Pittsburgh. The job is still not completed at this time. However, there are about 8,000 students attending classes, on many of the Cathedral's 42 floors, not to mention visitors to the Darlington Memorial Library that occupies three floors, the permanent use of faculty clubrooms, and the general service activities.

Changes in design or embellishment

left portions of the structure in the rough for considerable periods of time, until final details could be decided. For instance, the Cathedral was designed for 52 stories, and then revised for 42 floors, but retained its original height.

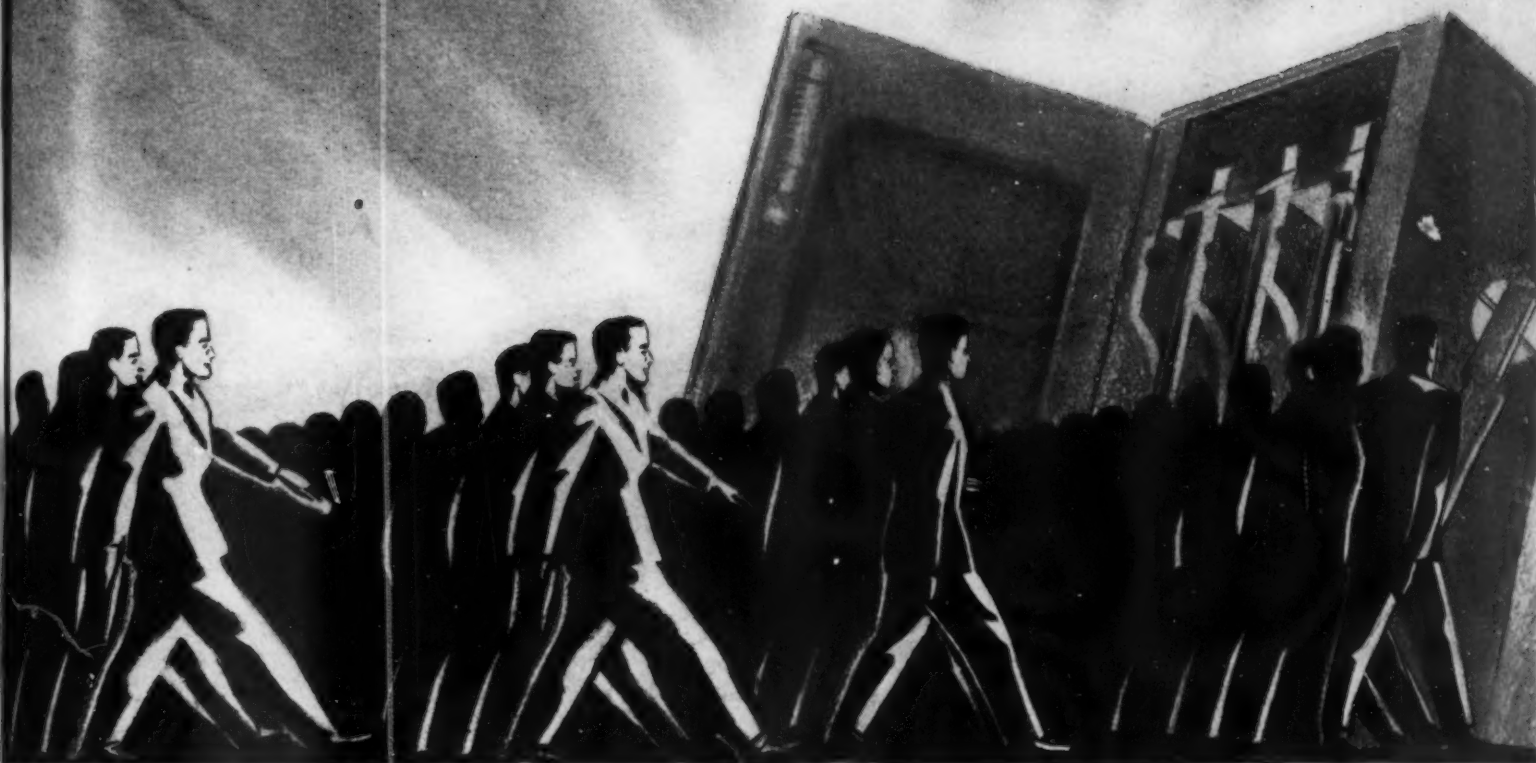
So while the electrical work underwent considerable revision, its rough portions often had to withstand years of abuse from the traffic of heavy materials and construction equipment in busy corridors. This was anticipated and guarded by careful installation methods. As a result of these precautions, W. J. Rothrum, Iron City's electrical superintendent on this project since 1930, has had very few cases of trouble. The score—no grout filled conduit because of loosened couplings, no conduits flattened by heavy falling objects, and no boxes or cabinets knocked out of partitions.



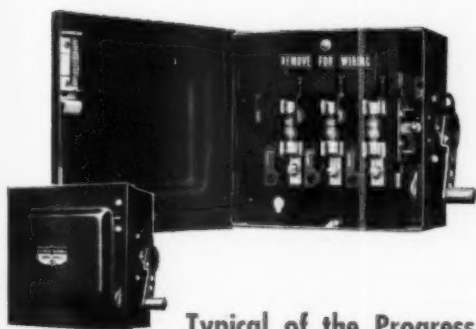
PAVED FOR SAFETY—Here a typical group of top-of-floor conduits have been covered with concrete until the final floor work is completed by others.

Electrical Contracting, March 1938

PROGRESS STOPS FOR NO MAN



"ON THE MOVE WITH CUTLER-HAMMER"



Typical of the Progress Cutler-Hammer has brought to Safety Switches — Bulletin 4115 . . . Type A

1. Compact construction. The two-pole 30 amp., 250 volt size measures only 8 x 6¼ x 4½, thus can be mounted direct on machine making fine appearance either above or alongside a small Cutler-Hammer Starter.

2. Ease of demounting. The entire operating unit comes out upon loosening just two screws, promoting easy installation.

3. Dead front (the modern trend) with fuses in the front, terminals near the top, provide accessibility when changing fuses.

4. Sturdy, long-life construction. Contacts are silver-plated, double break; all metal parts cadmium plated. Construction prevents heating, provides high interrupting capacity, excellent current-carrying characteristics and long trouble-free life.

● The genius of America consists of its ability to bring better and better things to a greater and greater number of people. That progress can never stop for the man who will not or cannot keep abreast.

In step with the philosophy of modern times, Cutler-Hammer is forever experimenting, forever pioneering, to find ways of making Cutler-Hammer equipment better . . . and better . . . and better.

Bulletin 4115 Type A Safety Switch is typical of the progress Cutler-Hammer brings to safety switches.

Not only does it appeal to a wide market because of its current carrying and current breaking performance; not only does it lend itself to greater use because of its sturdy construction, its ability to stand up under severe service conditions; not only is it safer, better in every way; but it brings all these advantages in an extremely compact design—without sacrifice of its great stamina and capacity.

This is the quality of product people want today. This is the quality they will have. CUTLER-HAMMER, Inc., Pioneer Manufacturers of Electric Control Apparatus, 1306 St. Paul Ave., Milwaukee, Wisconsin.



Your Eyes
have never seen



the things that are
Safecote

THERE IS NO SUBSTITUTE FOR

Just as the largest portion of an iceberg is hidden from view, so no human eye can see the things that make Safecote electrical conductors.

Safecote is generally known as having certain "on the surface" features:



Flame Retarding ★ Moisture Resisting ★ Fishable-slick Finish

But...wire is not Safecote just because it happens to have some flame retarding, moisture resisting and fishable qualities, any more than a violin is a genuine Stradivarius simply because it is shaped like a "Strad", has strings like one and can be played upon.

Only time and service will show proof of the superiority of Safecote. Time will demonstrate the permanence of its flame retarding, moisture resisting coating by which the insulation is hermetically sealed

against such destructive agents as moisture, light, air... While your eyes have never seen the things that make Safecote...your eyes *can* see the Trade-Mark that assures your getting genuine Safecote...built to Safecote standards under the supervision of the Safecote Laboratories.

Look for the Safecote Trade-Mark

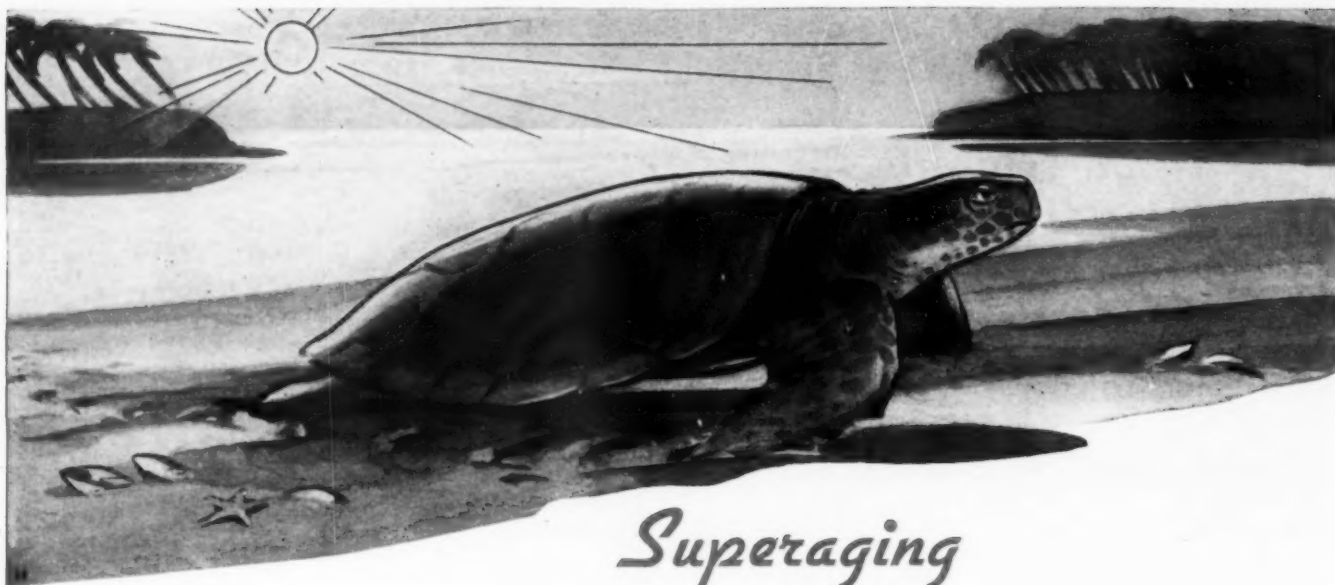
ELECTRICAL



CONDUCTORS

R Safecote

SAFECOTE LABORATORIES ARE AT YOUR DISPOSAL
SAFECOTE PERFORMANCE SPECIFICATIONS UPON REQUEST
GEORGE C. RICHARDS, LICENSOR'S AGENT
155 EAST 44TH STREET, NEW YORK CITY



*Superaging
Heat Resisting
Moisture Resisting*

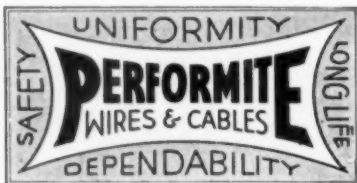
PERFORMITE

THE MODERN RUBBER INSULATION

By all known accelerated aging tests Performite rubber insulation is far ahead of any other commercial insulation. It is non-corrosive, free-stripping, long-lasting. Performite shows surprisingly little deterioration in the oxygen bomb, air bomb and air oven accelerated age tests.

One of its outstanding characteristics is its resistance to deterioration by heat. It is rec-

ommended for operation at conductor temperatures up to 75 degrees Centigrade, thus providing a tangible advantage over most other types of rubber insulation in economy of copper size. Its stubborn resistance to heat makes it better suited than ordinary rubber insulations for hot locations.



Licenses to make Performite have been granted to:

American Steel and Wire Company
Anaconda Wire and Cable Company
Bishop Wire and Cable Corporation
Collyer Insulated Wire Company, Inc.

Essex Wire Corporation
General Cable Corporation
General Electric Company
Habirshaw Cable and Wire Corporation
National Electric Products Corporation

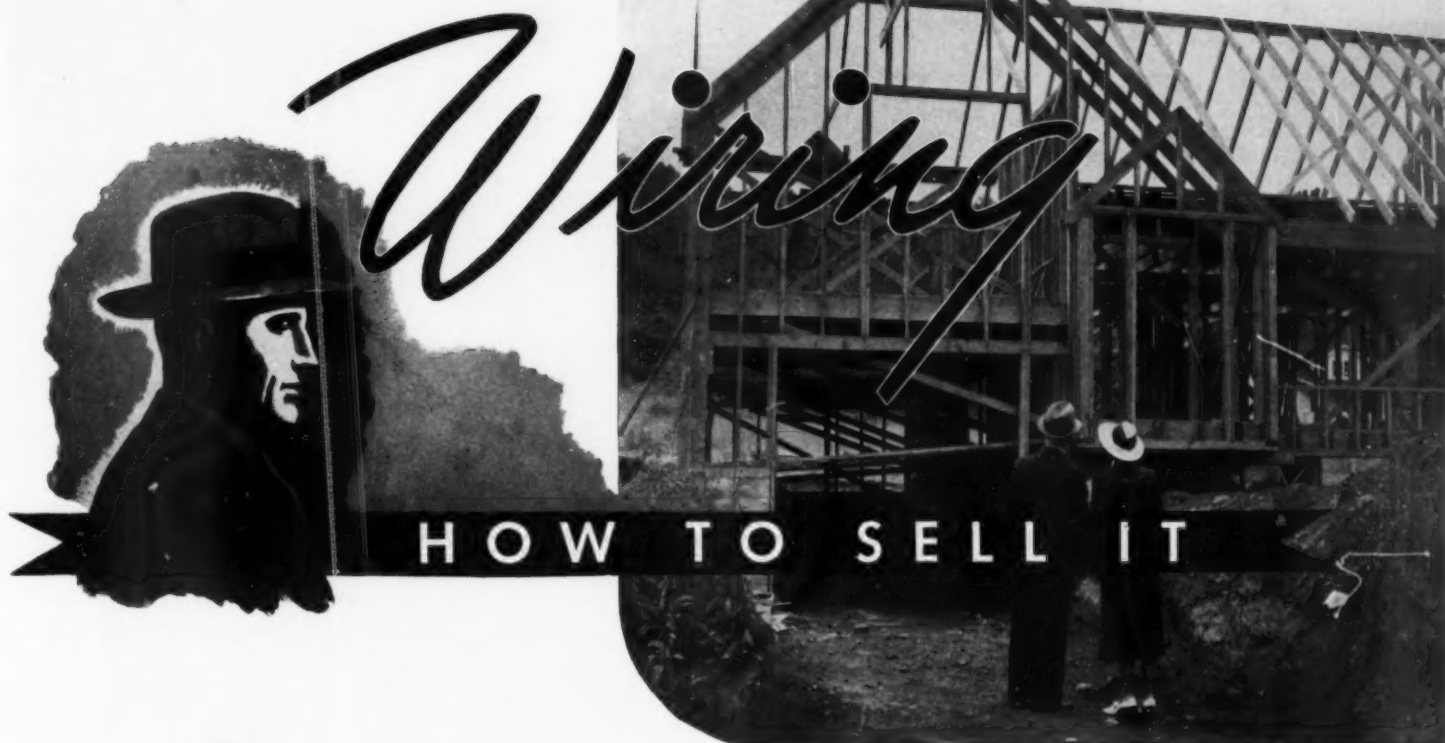
John A. Roebling's Sons Co.
Rome Cable Corporation
Simplex Wire and Cable Company
Triangle Conduit and Cable Co., Inc.

HAZARD INSULATED WIRE WORKS

DIVISION OF
WILKES-BARRE



THE OKONITE CO.
PENNSYLVANIA



The MARKET on WIRING—in Your Town

WIRING has long been looked upon by many contractors as something that you can not sell. It comes by the grace of God—so to speak. Somebody puts up a new building and needs wiring. Or, somebody else has a fire or wants to modernize a store or factory. So an electrical contractor gets a job.

This idea has spread, until it has become the general attitude throughout

the industry. And yet wiring is actually as salable today as anything else that people buy. True, you can't make customers build stores or homes just to create wiring business for you. But you can certainly increase their interest in better, more complete electric service for lighting, air conditioning, power, cooking and all the other uses. And to help them obtain it, you can sell them more and better wiring, just as you can

sell them brass piping, insulation, paint, tiling, floor coverings or anything else that has a modern market.

It's time to change this passive attitude! Let's look this market in the face! Let's ask where wiring can be sold in your town? The answer is—

1. Each year—bad times or good—a certain number of new buildings go up—stores, offices, factories, institutions, apartments and homes. There is part of your market.

Some wait for the builder or the owner or the architect to call up and ask for a bid. Some watch for news of coming construction and go after it. And when they go, they go with facts and show the man where to improve the electrical installation. They make him want more wiring to provide more service, more economy, more convenience, more comforts.

2. But that is not the whole market. That is only about one-tenth of it. The rest waits in the familiar buildings all over town that are already wired. Here in these old buildings—residential, commercial and industrial—there is lots more selling to be done. There is a way just as there is a way to sell new buildings.

And how?

That's what these pages are about.



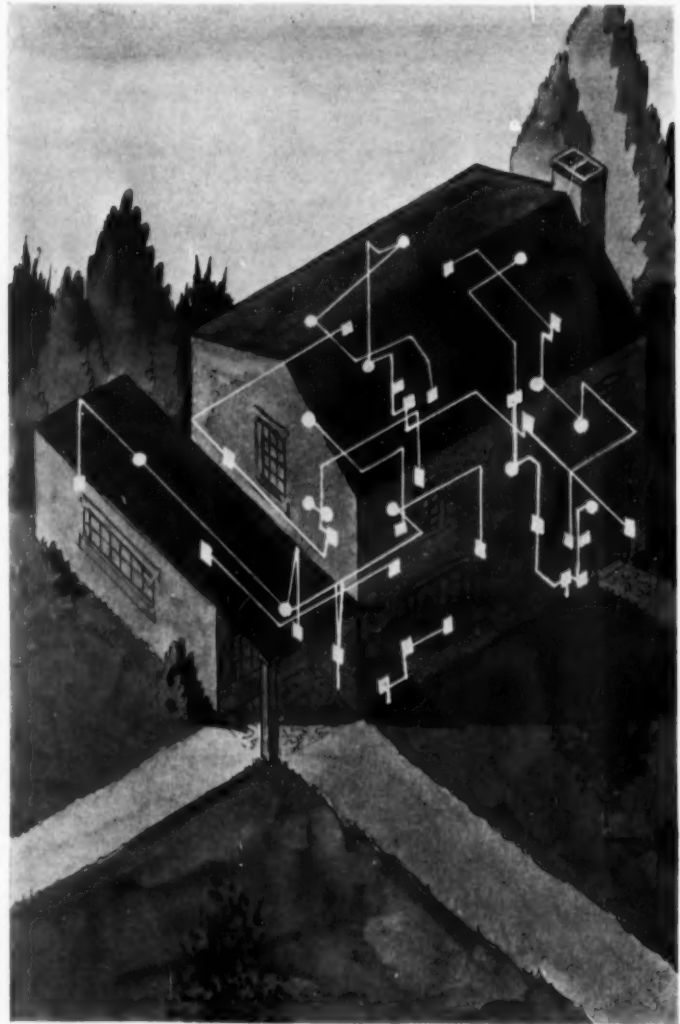
YOUR TOWN has all the varied types of prospects waiting for more comforts from adequate wiring—Go out and sell them!

The SIMPLE TRICK *of* SELLING

SELLING wiring is a simple trick. The trouble is that almost nobody has been doing it. Most contractors just let people buy it. On house wiring and other small jobs the practice has been woefully simple. Four steps are followed—

- 1 The customer sends for a contractor—or the contractor hears something is wanted and drops in.
- 2 He looks the ground over, figures the job and leaves the customer a written proposal to wire so many outlets for so much money.
- 3 The customer calls in another contractor—or several—and tells him what outlets he wants.
- 4 The other contractor proceeds to unsell the customer on a few outlets, so his price will be lower than any previous figure.

This has been standard practice on small work. And, of course, small work means maybe 80 per cent of the whole volume of the electrical business. And,



NERVE SYSTEM of the modern home—the wiring must serve every point. It needs planning. (A. W. Bureau material)

FOLLOW THESE SIX STEPS

1. Periodically send suggestive advertising to householders and merchants. Phone and visit architects and builders.
2. When you figure and write your proposal, draw a rough plan. Show all switches and receptacles. Fill in a simple specification. State what grade of material, what size wire.
3. Tell the customer to get all competitive bids on these same plans, the same number of outlets and circuits, the same size of wire so prices will be comparable.
4. Tell him to have the inspector check by this plan to see that the job is done completely and correctly.
5. Hand the customer a check list so he can see if there is anything else he should include in the job.
6. Hand him templates of furniture and receptacle plates to play with and see if there are enough outlets planned.

of course, this scalping process, reduces the size of each job and cuts the labor, the material and the chance for profit.

It also gradually lowers the whole standard of electric service in the country. People have fewer switches and receptacles. It becomes less convenient to use appliances and light. And because the Joneses are satisfied with inadequate wiring—so is everybody else.

Now, suppose instead of this present standard practice of getting jobs by unselling outlets, we introduce a little smart selling into the wiring business. You will then use these eight steps—

- 1 Every six months you will send a folder or some other advertising matter to your old customers, to other householders and merchants, suggest-

ing more outlets for comfort and time saving. (You will secure this material from the National Adequate Wiring Bureau.) You would also keep in touch with builders and architects by 'phone and dropping in on them every so often. Out of it you will get more chance to figure jobs.

- 2 When you look the building over or examine the plans, you will write a proposal, such and such outlets and circuits for so much money. But you will not stop there.
- 3 You will also draw a rough plan—not a precise drawing done with a T-square at the office—just a rough sketch showing the rooms, as you pace them off. You will do it with your pencil on cross-hatched paper, with little squares—4-inch to the foot. You will also

mark in all the outlets you have figured on. You will also fill in a simple specification sheet showing sizes of wire and other details that show what grade of material you will furnish. You will list in your proposal what brand of wire and other major equipment you will install.

4 You will hand your proposal to the customer with these words—"Mr. Customer, I have planned this wiring to suit your house and your furniture. This is what you need for full comfort. This is the grade of material you should use. If you secure any other bid to check my price, hand this layout sheet to the other contractor. See that he figures on the same number of outlets and circuits, the same size of wire, so the prices will be comparable. If he should advise you to leave out any outlets, make sure which ones you wish to give up, what comfort you are willing to sacrifice."

5 And then you will add—"You will find this little plan of value also when the inspector comes to look over your installation. Hand him this Layout Sheet too, Mr. Customer. Ask him to check up and tell you if the work has been done correctly and completely."

6 And then you will add this also—"On the back of this Layout Sheet, Mr. Customer, you will find a Check List of Things to Enjoy in a Wiring Installation. I think it would be worth your while to study it and see if there is anything else you should include in this layout while you are about it."

7 And then on a house job, you will also add—"Here is another little gadget that you may like to play with, Mrs. Customer. These are cutouts of standard furniture, drawn to scale. Cut them out with your scissors and you can lay them down on this rough plan or on your blue prints. See if we have put in enough receptacles to have one convenient to all beds, chairs and tables. Remember, you may change the furniture around some day. Now is the time to provide all the receptacles you are ever going to need—at the least cost."

8 Then on an old house job, you will further add—"Here are cutouts of receptacles. If you want to see how convenient an extra one would be somewhere, what it would look like there, just cut it out and pin it on the wall or baseboard with a thumb tack. This is the time to put it in!"

Now what will be the result of such a method of selling? Your customer will see clearly just what he is going to get—not just so many abstract outlets, but receptacles and switches, here and there and there in each room. He will see a list of other facilities and equipment he might enjoy. He will have a chance to play with furniture templates and convince himself that he has provided for enough receptacles.

But in addition to that you have done something else. You have not only sold

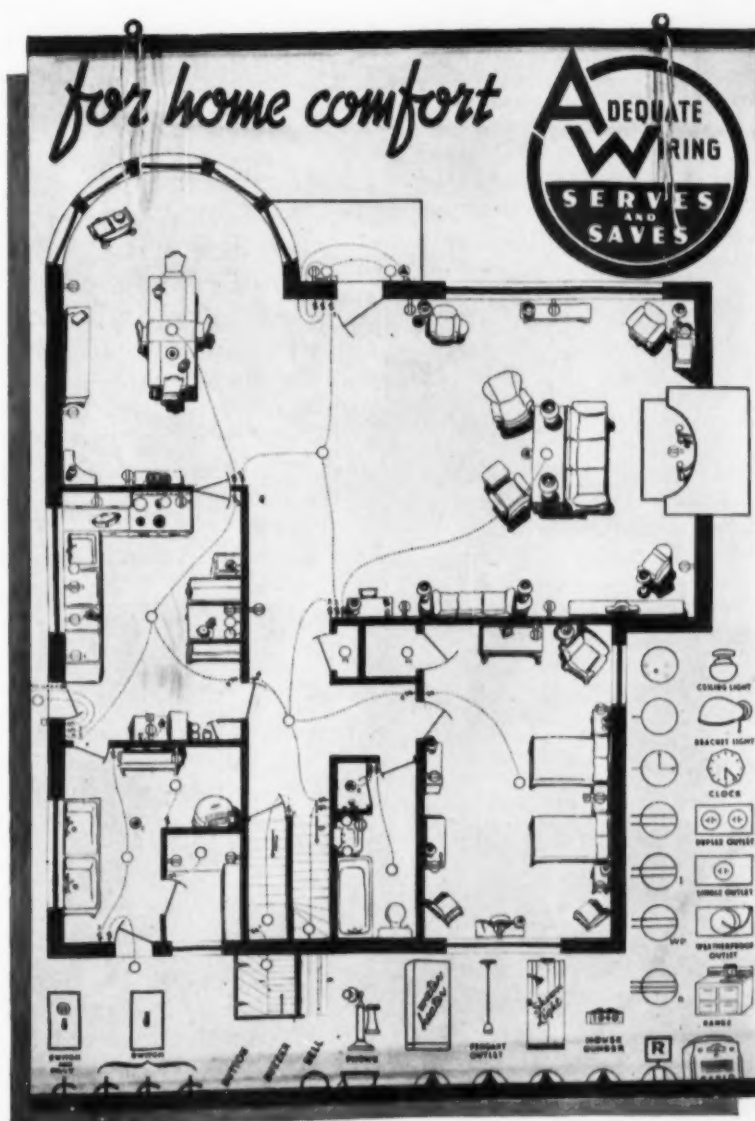
him a wiring job. You have sold him yourself! You make everything definite and plain. You state what grade of materials you will furnish. You help him decide what he needs and why. You let him check over the further possibilities for himself. He will have confidence in you. That is the most important part of a sale.

And if he gets another bid to check your price, he is already armed against the chiseler. If a scalping contractor suggests that fewer outlets will make the job cost less, the customer says—"Which outlets can I cut out?—Oh, no not that one! I need that one!" Also, he will ask what size of wire and whose

receptacles are to be used by this man.

So automatically you are protected against the scalped bid. This simple trick of selling will bring you much more of the business that you figure on. It will bring you a better price, because you will be no longer afraid to recommend adequate installations.

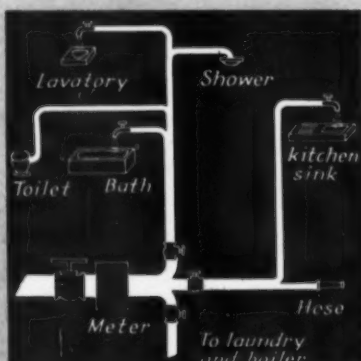
It is as easy as that. And on pages following you will see a sample of the Layout Sheet, Proposal Form, Specification, Check List and the template of furniture and receptacle plates, that you need to use this simple trick of selling. They are available to you, at cost, in any quantity, re-written for use by the customer.



LECTURE CHART—To illustrate adequate wiring in talking before meetings and for your office. (A. W. Bureau material)

PIPES

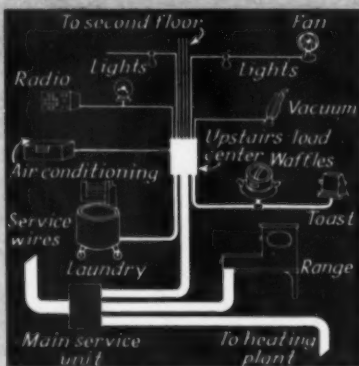
must be
Big Enough



Everybody knows that water pipes must be of ample size. The small pipes for basin, tub and toilet are fed from a larger pipe. The main from the street is still bigger. The system must supply enough water so that many faucets can run at once with full pressure.

It is just the same with wire. Small wires run from lamps, switches and receptacles to larger mains. Still larger wires bring the electricity in from the street.

Be sure you have big enough wires to give you full pressure at all points at all times. Then lights will not be dim or blink and the toaster will not be slow.



WIRES

must be
Big Enough

WIRING—HOW TO SELL IT

(Recommended Proposal Sheet)

Proposal for Wiring

To Mr. _____

Street _____

City _____

We will be glad to wire your house-store-shop at _____, installing circuits and outlets as indicated on the rough layout (Pages 32 and 33) and noted on the specifications (Page 31). We will provide a total of _____ outlets for lighting, _____ switches, _____ receptacles and _____ circuits for the sum of \$ _____

The job will be completed subject to the usual inspection. But as an indication of the high standard of quality on which the job is figured, we will install the following makes of equipment—

Wire _____

Conduit _____

Entrance Equipment _____

Switches, Receptacles _____

Signal Devices _____

We assure you of the highest type of workmanship and will guarantee the job for a period of one year against any trouble caused by defects in the installation.

Signed _____

Company _____

Street _____

Telephone No. _____ City _____

We will be glad to send you copies of this Proposal Sheet in quantity at cost.

(Recommended Specification Form)

Your Guarantee of a Good Wiring Job

Your wiring job, as stated in the proposal (Page 30) and indicated in the rough layout (Pages 32 and 33) will be installed in accordance with the following specifications—

1 GENERAL—Installation of electric wiring and equipment shall conform with local building regulations, the National Electrical Code, and the requirements of the local Public Service Company. All materials used shall be new and approved by Underwriters Laboratories, Inc.

2 GUARANTEE—The contractor shall leave his work in proper order and, without additional charge, replace any work or material which develops defects, except from ordinary wear and tear, within one year from the date of the final certificate of approval.

3 SERVICE ENTRANCE conductors shall be No. wires.

☐ Overhead Service shall be ☐ Rigid metal conduit ☐ Electrical metallic tubing ☐ Service entrance cable.

☐ Underground Service shall be ☐ Lead covered cable in rigid metal conduit ☐ Electrical metallic tubing ☐ Parkway cable ☐ Cable with especially treated heavy braiding.

4 SERVICE EQUIPMENT shall consist of ☐ A wire enclosed switch rated at amperes volts, with suitable fuses ☐ A wire enclosed cir-

cuit-breaker rated at amperes volts ☐ Circuit panelboard without main switch.

5 BRANCH CIRCUITS—All lighting and convenience outlets (not otherwise provided for) shall be served by circuits of No. wire. Outlets shall be divided as equally as possible among these circuits, with due regard to serving rooms from more than one circuit.

Convenience outlets designated on the plans by shall be served by branch circuits of No. wire.

Circuits shall be installed in the following method: ☐ Knob and tube wiring ☐ Nonmetallic sheathed cable ☐ Armored cable ☐ Flexible metal conduit ☐ Electrical metallic tubing ☐ Rigid metal conduit.

6 BRANCH CIRCUIT EQUIPMENT shall be ☐ Fuses ☐ Switches and fuses ☐ Circuit breakers, as located on layout (Pages 32 and 33).

10 SPECIAL PURPOSE OUTLETS AND CIRCUITS shall be installed as shown on the plans. The circuits to serve them shall be

Circuit for	No. of wires	Size	Type of installation
.....
.....
.....
.....

7 WIRING INSTRUCTIONS—Lighting outlets, convenience outlets, distribution centers, switches and switch control shall be installed as shown on the plans on the rough layout (Pages 32 and 33). Final location of wired outlets must be verified by ☐ architect ☐ owner.

8 LIGHTING FIXTURES—☐ The contractor shall supply the lighting fixtures as selected by the owner for which an allowance of \$.... has been made in the bid.

☐ The owner will select and supply the lighting fixtures.

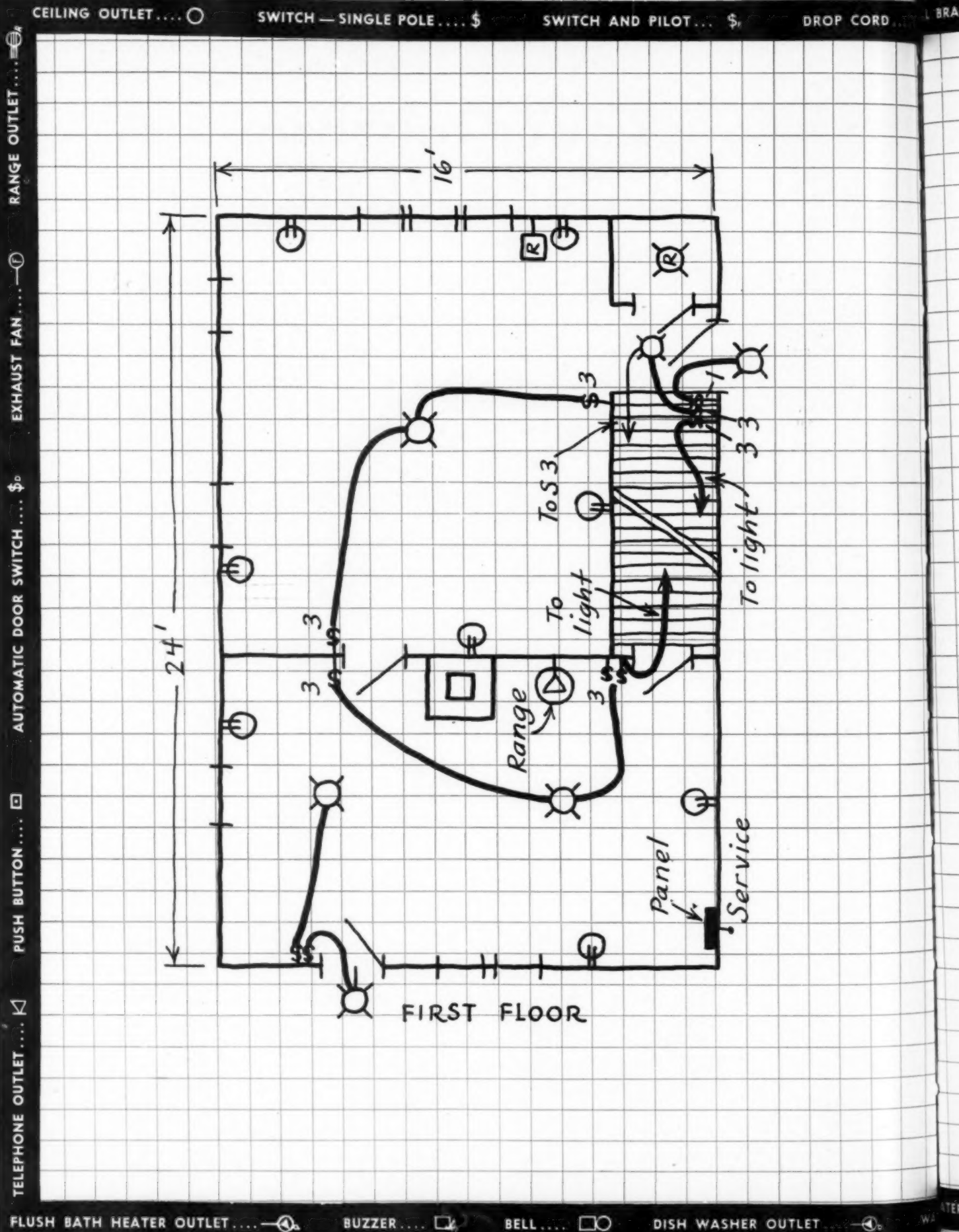
☐ The contractor shall install the lighting fixtures.

9 FEEDERS shall consist of conductors of No. wire. The type of installation shall be ☐ Rigid metal conduit ☐ Electrical metallic tubing ☐ Service entrance cable.

This is your guarantee of a good wiring job, adequate for your building and properly distributed to provide the facilities you need. For your own protection, see that any other bids you may secure also are based on the same number of outlets, located as shown in the layout, installed under the same specifications. Otherwise, the prices will not be comparable.

Your Town Electric Company
Anywhere, U. S. A.

We will be glad to send you
copies of this Specification
Sheet in quantity at cost.



Suggestion to Customer No. 1

This wiring layout is planned to suit your home and furniture. If you secure another bid, compare this layout and our specification with the other contractor's recommendations. See that he figures on the same number of outlets, the same size of wire. If he wants to leave out any outlet make sure just which one you wish to give up.

LAYOUT SHEET

WIRING—HOW TO SELL IT

BRACKET  DOUBLE CONVENIENCE OUTLET  RADIO OUTLET  CLOCK OUTLET 

MASTER SWITCH \$.75

SERVICE SWITCH \$.25

SWITCH—4 WAY \$.40

SWITCH—3 WAY \$.30

LIGHTING PANEL \$.50



Suggestion to Contractor

With this Layout Sheet you can easily make a rough plan for the customer, showing the outlets he needs. Do it as you pace off the rooms.

Let every square equal 1 foot. If a room is 12 feet wide, draw a line 12 squares long. Complete a rough floor plan, disregarding unimportant jogs and thickness of partitions. Mark in light outlets, receptacles, switches.

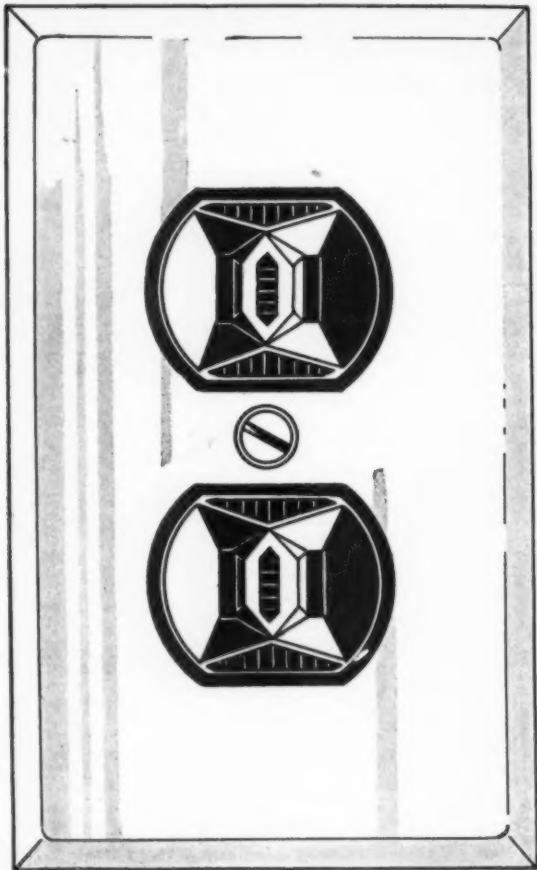
Give the customer this simple picture of what the job will provide. Impress upon him that he needs each of these outlets.

We will be glad to send you copies of this Layout Sheet, revised, in quantity, at cost.

WATER OUTLET  ILLUMINATED HOUSE NUMBER  WEATHERPROOF CONVENIENCE OUTLET 

Suggestion to Customer No. 2

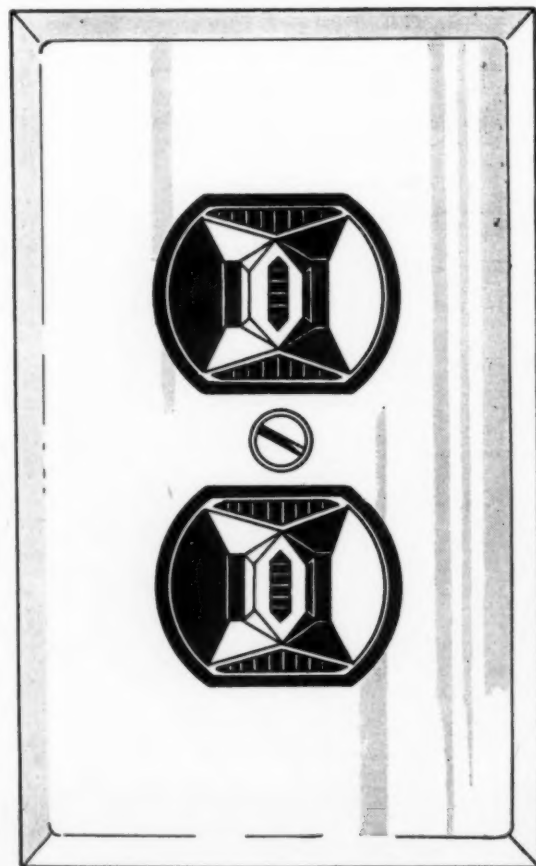
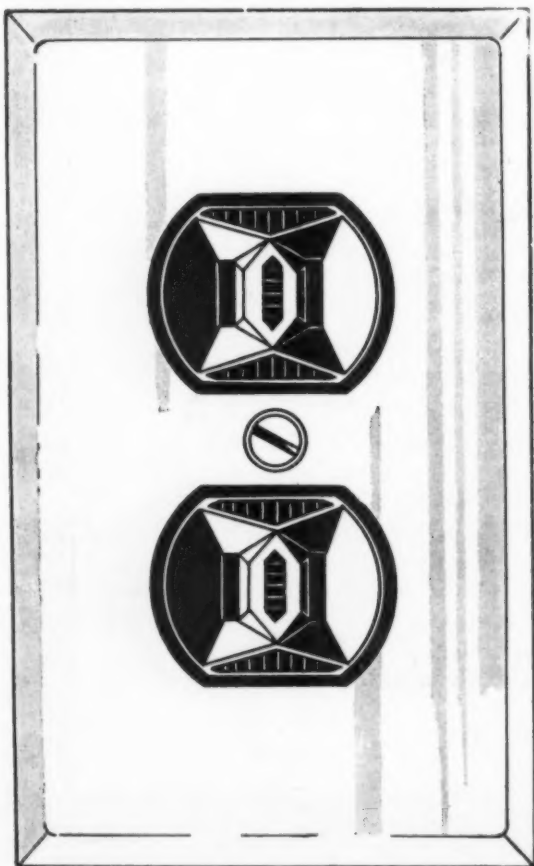
When the inspector comes, hand him this Layout Sheet so he can check up and tell you if the work has been done correctly and completely, according to this plan.



Get 'Em With GADGETS in Selling Old Homes

Cut out these life size pictures of duplex receptacles. Carry them in an envelope with a few thumb tacks. When talking to a prospect about more outlets, just stick the gadget on the base board or wall. Let her see how it will look in her own room, and she will want it.

Most folk don't see outlets when they are just talked about

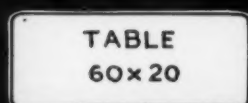
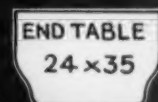
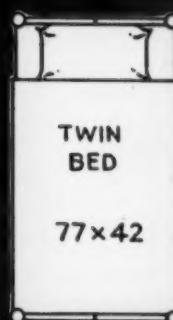
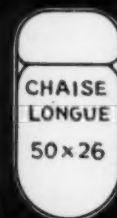
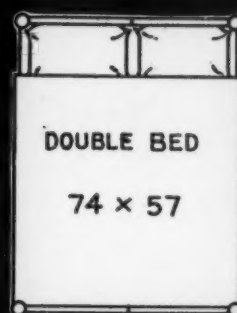
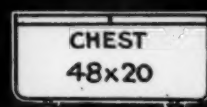


Get 'Em With GADGETS

in Planning New Homes

Cut out these templates of the usual heavy furniture (scaled $\frac{1}{4}$ " eq. 1'). Carry them with you in an envelope. In discussing plans, lay down the furniture for each room and show where outlets will be required. Then shift the furniture to other locations and see whether they will need still more.

We will be glad to send you copies of this Gadget Sheet at cost printed on heavy yellow card to cut out.



Make it all plain this way and comfort will sell itself

CHECK LIST OF

WIRING POSSIBILITIES

Things to Sell in Wiring

Homes, Stores and Small Shops

IN HOMES

LIGHTING OUTLET PROVISIONS

Attic Lights and Extension Cord
Bath Room—General Lighting
Bath Room—Health Lamp
Bath Room—Shadowless Mirror
Bath Room—Shower Vestibule
Bed Rooms—General Lighting
Bed Rooms—Portable Lighting
Breakfast Rooms and Dinettes
Cellar
Closets, Cupboards and Pantries
Dens
Desks
Dining Room Ceiling
Dining Room Coves
Dining Room Brackets
Entrances—General Illum.
Entrances—House Number
Entrances—Keyhole Spot
Fireplace Log and Grate Illum.
Fountain Spotlights
Fruit and Vegetable Rooms
Furnace, Fuel Room, Gauges
Garage—General
Garage—Work Bench
Halls
Kitchen—General Lighting
Kitchen—Range
Kitchen—Sink
Kitchen—Work Tables
Laundry
Lavatories
Living Rooms, General Lighting
Living Rooms—Mantles
Living Rooms—Portable Lighting
Music Rooms
Niches and Telephone Nooks
Night Hall Lights
Night Room and Stumble Lights
Paintings and Picture Reflectors
Play and Recreation Rooms
Porches
Portable Decorative
Portable Dressing
Portable Reading
Refrigerator Room
Solarium, Sun Room
Stairways and Landings
Statuary Spots
Storage Spaces
Tunnels, Air Chambers and Shafts
Vestibules
Work Rooms, Benches and Tables
Bug and Insect Killers
Christmas Decorative
Courts and Drives
Docks and Landings
Entrance Gates
Entrance Lodge

Fountains and Pools
Garages, Detached
Gardens
Lawn Lighting
Outbuildings
Outdoor Games
Protective Lighting
Yard Lighting

ELECTRICALLY HEATED EQUIPMENT

Bath Heater Built-in
Breakfast Room Appliances
Dining Room Appliance (Floor)
Dining Room Appliance (Wall)
Fireplace Heater
Irons, Portable
Kitchen Ironing Outlet
Kitchen Range
Laundry Dry Room
Laundry Hand Iron
Laundry Ironing and Pressing Mach.
Laundry Table Stove
Radiators, Air Type
Radiators, Immersion Elements
Outdoor—Kennels
Outdoor—Poultry Houses
Outdoor—Soil Heaters
Outdoor—Other Outbuildings
Portable Elect. Heated Toys
Portable Food Preparation
Portable Hair Dryers and Curlers
Portable Health Treatment
Portable Immersion
Portable Room Heat
Portable Sickroom
Portable Sterilizers
Portable Work Shop

FANS

Attic Exhaust
Garage
Kitchen
Laundry
Rooms

MOTORIZED APPLIANCES AND EQUIPMENT

GENERAL

Garage—Door Operating
Garage or Shop—Lathes and Grinders
Air Conditioning
Battery Charger
Elevator—Dumb Waiter
Emergency System
Musical Instruments
Outdoor—Feed Grinders and Conveyors
Outdoor—Fountain and Pool Pump
Sump Pump
Temp. Regulation System Compressor

Vacuum Cleaning Plant
Water Pump
Water Treatment
Window and Door Operating

HEATING—MOTORIZED

Ash Conveyor, Hoist
Boiler Feed and Vacuum Pumps
Furnace Blower
Gas Valve
Incinerator Blower
Oil Burner
Stoker

KITCHEN AND LAUNDRY—MOTORIZED

Dishwasher
Refrigerator
Refuse Grinder
Ventilating Fan
Dry Room Conveyor
Ironer
Washer

PORTABLE—MOTORIZED

Blowers
Clocks
Fans
Lathes
Mechanical Toys
Polishers
Vacuum Cleaners
Vibrators
Waxers and Polishers
Burnishers
Extractors
Grinders
Mixers
Peelers
Hedge Clipper
Lawn Mowers
Automatic Emergency System Throwover

CONTROLS

EQUIPMENT

Faucet Controlled Water System
Float Controlled Sump Pump
Push Buttons—Elevators, Dumbwaiter
Range-Water Heater Limiter
Remote Control, All Distant Equip.
Remote Control, All Inaccessible Equip.
Remote Control, Attic Ventilator
Remote Control, Musical Instrument
Remote Control, Radio
Remote Control, Water Pumps
Thermostats, Heating and Air Cond.
Time Switches, Fixed Devices

WIRING BIDS

become

WIRING CONTRACTS

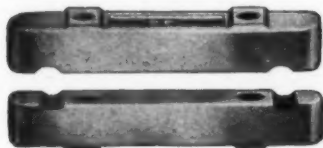
when you figure on using

PORCELAIN KNOBS and TUBES



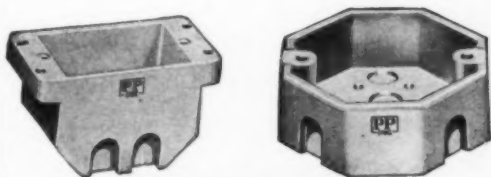
ALLIGATOR NAIL KNOB

Combines dielectric properties with supporting strength—extra heavy leather washers absorb hammer blows—criss-cross corrugations insure positive grip. Safe, simple to install and economical.



TWO WIRE CLEAT

Like the Alligator Nail Knob, the new two-piece cleat is a money saver—money maker for distributors. A good piece of tough electrical porcelain made to space the wires correctly and grip them permanently.



NEW ALL-PORCELAIN OUTLET BOXES

Furnished in glazed and unglazed styles which conform to all existing standards of dimensions, spacing, position of knock-outs and mounting screws. Switch box has No. 6-32 tapped metal inserts . . . outlet box has No. 8-32 inserts.

Descriptive literature is available on all above items and on the better wiring system—installed with porcelain insulators.

THERE is added profitable business to be gained by taking advantage of the widespread demand for Porcelain Products, in wiring all types of buildings. You can make lower bids on prospective jobs because there is less material cost involved in installation the simplicity of design of concealed knob and Tube and open Cleat wiring reduces this expense. This lower material cost also permits a larger margin of profit on every job for you!

And don't forget that your customers stay satisfied. Porcelain is impervious to dampness or fumes, heat or fire, and never suffers from just plain old age!

Inspectors favor all-porcelain insulated wiring because the air space between conductors keeps them cool when well loaded, prevents fire-hazard and eliminates shorts.

WRITE for our latest bulletins. They explain why, where, when and how to use and sell Porcelain Products . . . and will be valuable in interviews with architects and builders.

PORCELAIN PRODUCTS INC.
FINDLAY, OHIO -- PARKERSBURG, W. VA.

PILOT LIGHTS

Attic Lights
Attic Exhaust Fan
Bath Room Occupancy
Cellar and Storage Room Lights
Garage and Yard Lights
Gas Water Heater Burner Valve
Heating Appliance Outlets
Protective Lights
Remote Controls for Equipment
Stairs and Halls

WALL SWITCHES

Automatic-Trip Door Switches
Entrance, Key Switch Master Control
Momentary Contact Key Hole Spot
Multi-Location (3 or 4-way) Switches
Multi-Location Gas Water Heater Control
Multi-Location Gate or Lodge—Residence
Multi-Location Hall Entrances
Multi-Location House—Garage Control
Multi-Location Master Control
Multi-Location Protective Controls
Multi-Location Radio Control
Multi-Location Stair Flights
Multi-Location Tunnel or Shaft Entrances
Multi-Location Two or More Room Entrances
Multi-Tone Chime-Gong Control
Radio Silencing
Silent-Flip Switches
Single-Location (S.P.), Local Outlets
Stumble Light Control
Time Interval Shut-off Control
Variable-Intensity Coves
Variable Intensity 3-Element Lamp Fixtures

SIGNALS & ALARMS

Annunciators
Bells, Buzzers and Gongs
Burglar Alarms

SIGNALS & ALARMS

Children Summoning (Gongs)
Chimes
Cord Pulls
Fire Alarms
Maid—Dining Room Buzzer
Photo Cell Alarms
Play Room Current
Radio-Antenna, Ground, Room Outlets
Sick Room Signals
Telephones, Private Inter-Conn.
Telephones, Public
Theft-Alarms
Window & Door Alarm Contacts

OUTLETS

Accessible Plugging and Switching
Clearance of Doors and Radiators
Cord Length Reduction, Close Outlet Spacing
Half Switched—Half "Hot" Room Plugs
Most Useful Heights
Non-shockable in Damp Places
Water and Vapor proof—Air Chambers
Water and Vapor proof—Outdoor
Water and Vapor proof—Shower Bath

CIRCUITS

Alternatively Supplied Outlets
Appliance Free Lighting Circuits
Future Additional Capacity
Radially Routed Conductors

DISTRIBUTION CENTERS

Accessible Location
Area-Centered Distribution (Each Floor)
Extra or Spare Connections
Over-Current Protection, Circuit Breakers
Over-Current Protection, Fuses
Shock or Burn Protection

SERVICES AND EQUIPMENT

Mains—Extra Future Capacity
Residence to Garage, Underground
Clean, Dry Location
Circuit Breaker
Externally Operable Switch
Sub-Divided Heavy Circuit

IN STORES AND SMALL SHOPS

LIGHTING PROVISIONS

Backbar
Booth
Color Matching
Customer Desk Light
Display Case
Display-Multi-Outlet
Emergency Lighting System
Exterior Floodlights
Gauge & Instrument Lights
Night Watchman
Scale Dial
Signs—Directional
Signs—Outdoor
Signs—Window
Spots—Window
Spots—Portable & Store
Stair Floods
Xmas Decorative

ELECTRICALLY HEATED EQUIPMENT

Cigar Lighters
Demonstrators, Heavy Duty
Frying Kettles
Driers—Wash Room
Glue Pots
Griddles & Hot Plates
Irons
Heaters—Built-in and Portable
Heaters—Hot Water
Ovens—Ranges
Percolators—Urns
Pop Corn Machine

Solder Irons
Stamp & Branders
Sterilizers
Toasters, Waffle Irons

MOTOR OPERATED EQUIPMENT

Air Conditioner
Battery Charging & Power Units
Burnisher—Buffer
Candy Cabinet
Ice Cream Cabinet
Carbonator
Cash Register
Compressor—Air
Coolers, Water
Demonstrators, Heavy Duty
Dishwashers
Dumbwaiter
Elev. & Escalator
Fans—Ceiling, Portable, Wall
Fans—Unit Heater & Ventil.
Grinders—Coffee, Meat, Knife
Humidifiers—Cigar
Juicers—Fruit
Machines, Office
Machines, Vending
Mixers—Beverage
Music Producing
Oil burn., Stokers, Gas Valves
Pumps—Beer
Pumps—Fuel, Sump & Water
Refrigerators
Sewing Machines
Slicers
Turn Tables—Display
Vacuum Cleaners
Waxers

COMMUNICATIONS—SIGNALS

Annunciator
Bells, Buzzers, Chimes
Button & Aux. Contacts
Code Calls, Paging System
Clocks
Lamps—Indicating
Pilots—Cellar, Closet & Room
Pilots, Heating Appl.
Pilots—Remote Controls
Pilots—Vault & Refrigerator Ltg.
Public Address
Radio
Teleph.—Priv. Inter-Conn.
Telephone, Public
Time Stamps

ALARMS

Burglar
Fire
Fuel, Pressure, Temp.
Sprinkler
Vault and Storage Room, Photocell

CONTROLS

Bay Area Remote Control
Booth and Closet Door
Door Opening (Photo-Cell)
Night Watchman
Shock-Proof Outlets
Sign Flashing
Time Clock Switches
Window and Store Remote
Ventilation

WHEN YOU SELL WIRING

**BE SURE YOU SELL AN ALL PORCELAIN
ILLINOIS SYSTEM**



**... AND MEET EVERY REQUIREMENT
MOST MODERNLY, COMPLETELY, DEPENDABLY**



SWITCH BOXES

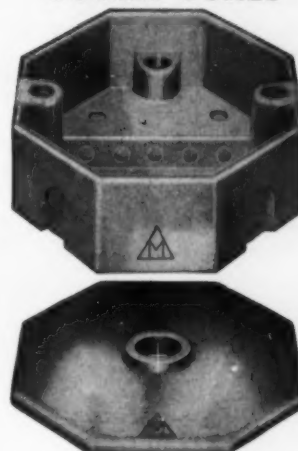
Insure greater safety in wiring and the elimination of all grounding hazards. Made of the best quality of white porcelain. Metal inserts are placed in two holes of the switch boxes for receiving screws of standard switches, plug outlets, etc. Knockouts for single wires, also for cables. Specify and use them.



KNOBS

Cement coated — extra length nail — genuine leather washer — code standard. They don't chip when driven in and they do stay in place and have a firm grip. Available in a wide variety of heights, diameters, holes, and grooves.

OUTLET BOXES

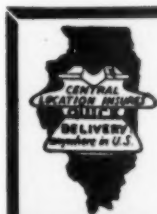


Glazed and unglazed styles conforming to all existing standards of dimensions, spacing, position of knockout holes, and mounting screws. High mechanical and electrical efficiency.

• These safe, economical, efficient, and easy to install insulating wiring systems of porcelain will help you to increase your installation business and build profits. This system is available for residential and farm wiring and insures permanency and utmost safety. Use this system where dampness and fire hazards are prevalent, such as in warehouses, cold storage and packing plants, dairies, chemical works, ice plants, breweries, etc. Grounding is unnecessary when you use this system. Clamps are not required for porcelain boxes. No rusting or corrosion troubles.

Send for new Bulletin

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILLINOIS

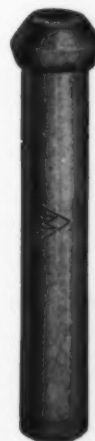


PROFIT BY USING
ILLINOIS
AS YOUR SOURCE
OF SUPPLY

to Standardize on

ILLINOIS

is a Progressive Step



STANDARD TUBES

In sizes 1/2 to 48 inches long, 5/16 to 3 inch diameter in following types: unglazed, glazed, split, floor, split floor, headless, curved end, crossover split, and crossover. Diameters all uniform both inside and outside.

Now-

install Surface Connections
in ONE-HALF the TIME



with these NEW

SURFEX

SURFACE WIRING DEVICES

**NO Boxes
NO Connectors
NO Splicing
NO Soldering or taping**

*Saves 1 Foot of Cable
at Every Outlet*

**New Speed ...
New Beauty
on Every Job ...**

Simpler

and easier to put up. You save one-half the time usually spent on every outlet, because all the necessary parts install as a single unit. There are no connectors, no splicing and soldering of wires, no rubber and friction taping.

And they give a neater-looking job—a more modern appearance that property owners everywhere like. That's why they're preferred in cottages, in attics, in basements and private garages. More—they provide the very safety features on which most farm-building wiring contracts hinge.



BASEMENTS and ATTICS



FARM BUILDINGS



COTTAGES and CAMPS

5

less things to do

THIS:

1. Mount the device
2. Run the wire [armored or non-metallic]
3. Connect the terminals

instead of THIS:

1. Mount the box
2. Run the wire
3. Install connectors
4. Splice
5. Solder
6. Apply rubber tape
7. Apply friction tape
8. Connect the terminals

Corrosion-Proof, Shock-Proof

SURFEX DEVICES

for
SURFACE WIRING

Will Open Up New Wiring Jobs for You

These simpler, safer SURFACE WIRING DEVICES are made of porcelain—a valuable feature in the wiring of farm buildings. For Surfex gives complete protection against the corrosion of ammonia fumes and moisture—protection against electrical shock harmful to animals—protection against short circuit dangers with inflammable materials.

Here's growing wiring business available to you now—producing quality jobs meeting the strictest requirements of users—approved by underwriters in every detail. A Surfex system saves you hours in installing and testing out, saves dollars in materials. Result: More profit to you—and more satisfaction to your customers.

See Surfex at your jobber's today; or write for free descriptive folder on this great forward step in SURFACE WIRING.

PASS & SEYMOUR, INC.

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Without cost or obligation, please send me complete information and prices on your new line of SURFEX wiring devices.

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Mail **NOW—**

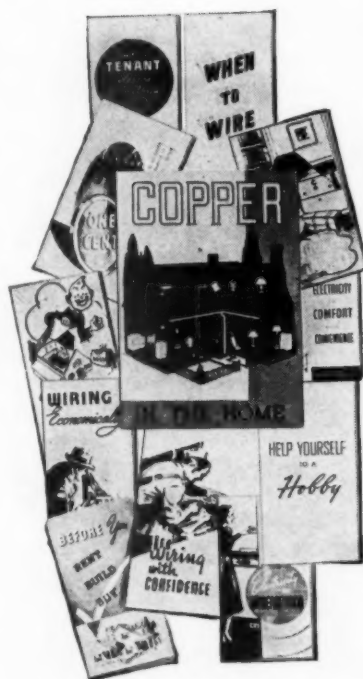
LAYING OUT THE SMALL JOB

SMALL jobs offer all kinds of opportunities for the contractor. Usually no architect or consulting engineer is employed here. So the contractor is not only the doer of the work but can advise the builder. And the builder will listen if suggestions are intelligent.

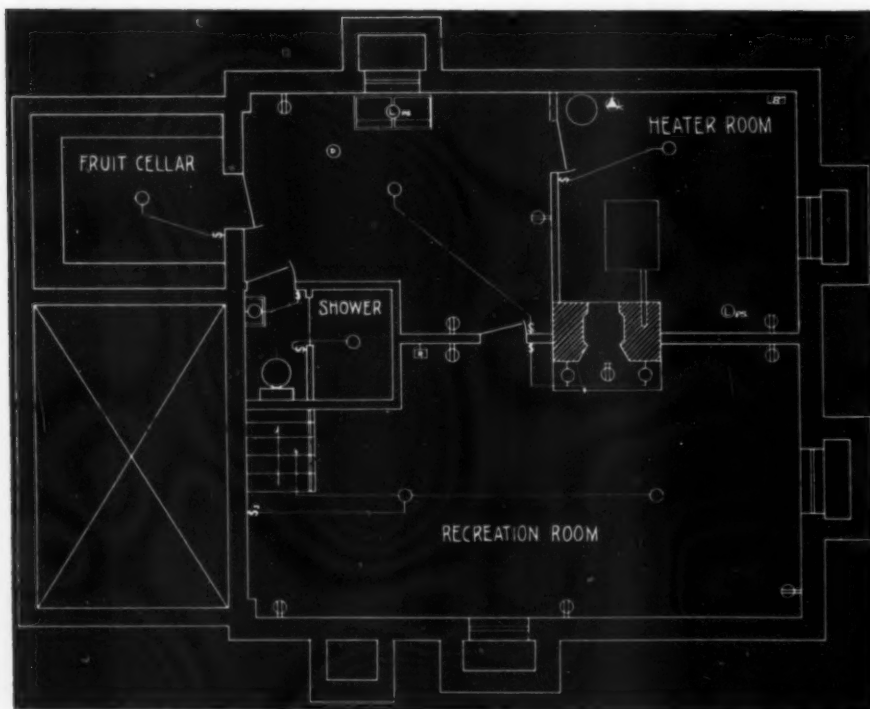
It is not hard to sell the small home one or two extra outlets, a few closet lights, a 3-way switch control. It is not hard to make the small store appreciate that extra fixtures in the window or special switching, will help present the goods to better advantage. It is not hard to show the small factory how better lighting improves employees efficiency, how larger wire and a good layout will save time and money, when changes or additions in equipment are made.

House Wiring

Demand for electricity has changed so much in the home, that the contractor must forget what he did five years ago. New appliances, new standards bring new chances to build up a better job. Here are some points to check:



SELL BY MAIL with these smart folders and booklets. They tell why to wire. (A. W. Bureau material)



BASMENT LAYOUT suggesting comforts often overlooked in the owner's planning. (From the Handbook of Interior Wiring Design)

1. EXTRA OUTLETS—Study the plans before you make your estimate. There is always room for extra outlets, switches—SP, 3-way and 4-way. Explain the advantages and you will sell some.

2. SERVICE CABLE—Two conductor service entrances will be antiquated five years from now. Sell 3-conductor entrances not smaller than No. 6 wire.

3. WIRE SIZE—Old No. 14 may be all right for lighting circuits that you know will never carry more than a small load. But sell your customer at least No. 12 wire in load areas of the house.

4. APPLIANCE CIRCUIT—Show how a special circuit to the refrigerator, ironer and washing machine will save outage, keep lights from flickering and avoid voltage drops.

5. LOAD CENTER—If the service entrance is in the cellar, a feeder system with small fuse or breaker panels upstairs, will increase the efficiency and save steps and inconvenience, if the fuse blows or the breaker trips.

6. CEILING OUTLETS—Fashions change. Suggest ceiling outlets in the living and dining rooms, even if at first plastered over.

7. CLOSET LIGHTS—Sell ceiling fixtures with pull chain control or door-switches in all clothes closets.

8. PATH O' LIGHT—Talk the Path of Light idea and sell three and four-way switches to provide control at all doors in active rooms.

9. OUTDOOR LIGHTS—Outdoor outlets and lights are needed on any house no matter how small. A weather-proof outlet at the front of the house with a switch inside the front door is useful at Christmas. Lights on the corners of the house under the eaves, controlled in the garage and house, provide for guests and for protection. Sell them.

10. DOUBLE CONTROL—Insist on switched double convenience outlets in the living room at least. Control one side from a wall switch, while the other side is permanently alive. Floor lamps can be turned off at the door. The vacuum cleaner can be plugged in the hot side of the outlet.

11. SPECIAL OUTLETS—Radio outlets, clock outlets, and fan-hanger outlets are frequently forgotten. Every home needs three or more radio outlets, one to two clock outlets and a fan-hanger outlet in the kitchen, at least. They should be installed.

12. GROUND CONNECTION—Tell your customer the safety in grounding heavy appliances. Recommend three pole outlets, wherever appliances of the heavier type are used, with either 3-prong or 2-prong plugs and a ground connection.

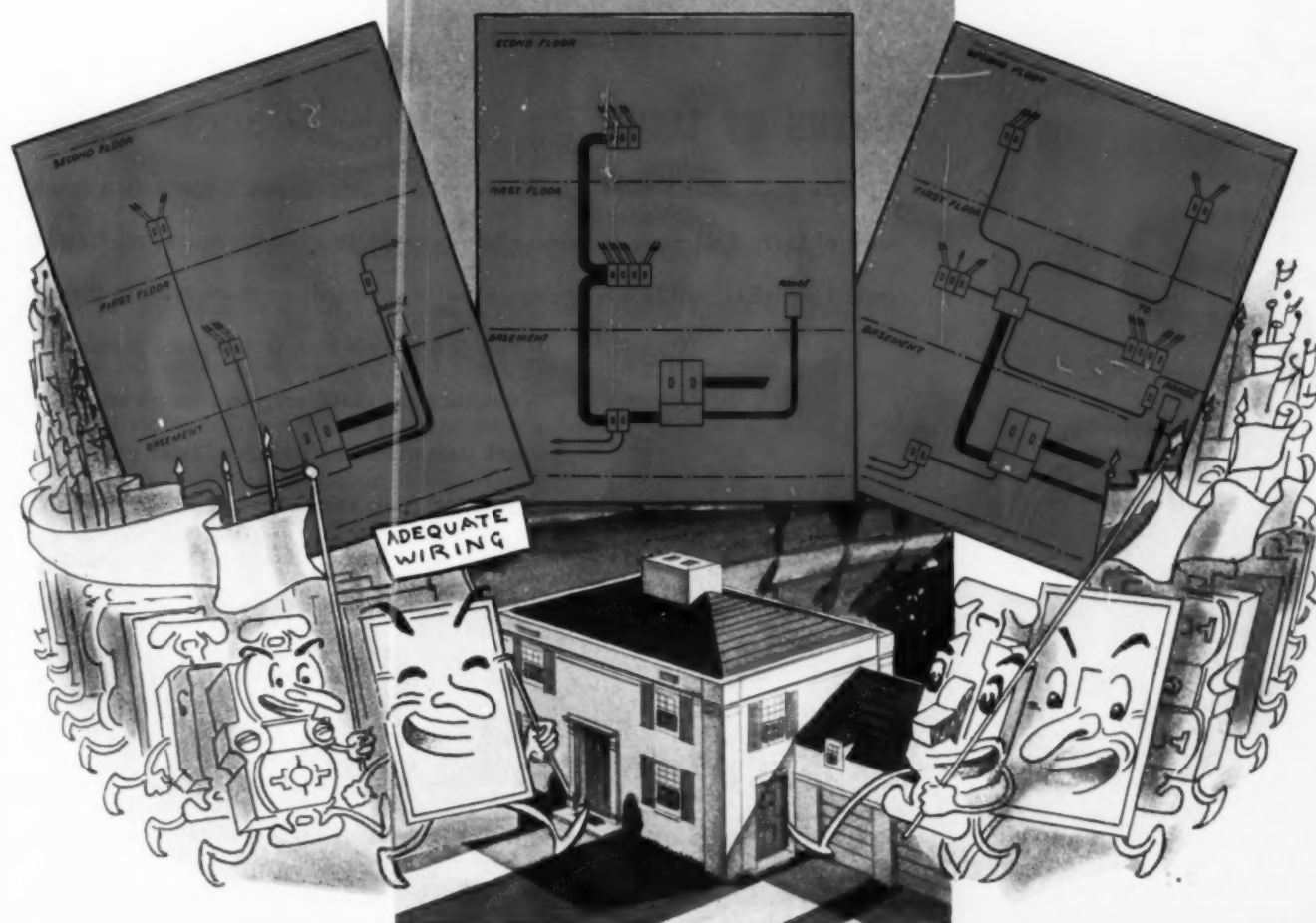
13. MASTER CONTROL—Master switch control throughout the house is protection feature that can be sold.

(Continued on page 47)

THERE'S MONEY IN ADEQUATE HOME WIRING

**GENERAL
ELECTRIC** WILL HELP YOU GET IT

WITH MODERN HOME WIRING METHODS . . .
INTEREST-CATCHING WIRING MATERIALS



*G-E RADIAL WIRING SYSTEM.

Sell the things people will buy — comfort, convenience, economy. Explain G-E Home Wiring* to your customers in those terms. They're sure to be interested because this modern wiring method enables full advantage to be taken of all modern electrical developments for the home. What is more, G-E Home Wiring installed now will provide for tomorrow's needs as well as today's.

To help you further, the line of G-E Wiring Materials is complete, including many items that will particularly catch the interest of your customers. They will make your explanation of satisfactory wiring more effective and will help to build up the size of your jobs.

Of course it is to your interest to install as complete wiring on each job as possible — for customer good will and for larger wiring jobs.

FOR
SUGGESTIONS
ON SELLING
ADEQUATE WIRING
AND ON INCREASING
SIZE OF JOBS

TURN
PAGE

GENERAL  **ELECTRIC**

USE THESE **GENERAL ELECTRIC**

It's easier to sell the advantages of satisfactory wiring when you have a definite wiring method to back up your sales talk and can offer interest-catching suggestions. General Electric will provide you with both. G-E Home Wiring* will prove a clincher in many interviews.

PATHS OF LIGHT

Everyone now-a-days appreciates being able to walk through a house in a path of light. Tell your customers how readily this convenience can be obtained if you install switches beside every door even in rooms when there is more than one entrance.

The G-E switch line is complete including single pole, double pole, three-way and four-way switches — standard porcelain box switches, totally enclosed compartment box switches and heavy-duty Textolite Box Switches. For a completely silent and long enduring switch, see the new G-E Sphinx Mercury Tumbler Switch.

**GENERAL
ELECTRIC**



BRANCH CIRCUIT-CIRCUIT BREAKERS

These circuit breakers provide convenient modern protection and control of circuits and are sure to appeal to your prospects. They can be located within a few feet of the outlets they protect, doing away with the necessity of going to the basement to replace fuses. Heavy wire can be run directly to circuit breakers located on the first and second floor. Can be mounted in standard outlet boxes with covers using brass or Textolite plates or in special circuit breaker enclosures with plates. Available in 15-, 20-, 25-, 30- and 35-amp. capacity.

OUTDOOR LIVING ROOMS

Show customers how to transform porches, terraces, etc., into outdoor rooms by installation of weatherproof electrical outlets—GE2959.



ERIC AIDS TO ADEQUATE WIRING

enures all the benefits you have talked about. The complete G-E line
an of wiring materials includes items to meet every need and provides
ou with background for many interesting examples of good wiring which
views, you can use to interest prospects and enlarge the job. For instance:

PROPER WIRE SIZES

a pit You, of course, know that wire sizes should be big enough for future as well as
ed if yent needs. But your customers may not. The quickest way to convince them is
entrans compare electrical wiring with a water system. A wire too small is like a pipe too
gle poall. Current, like the water, gets through with great effort, and a large percentage
— stan current is wasted in heat. Current that gets to the electrical outlets is materially
componduced in voltage. Point out how inefficient the wiring
Switch in many houses built a short time ago. Use G-E Code
Switch e, G-E BX or G-E BraidX. The line is complete.
itch.

WELCOME CONVENIENCES

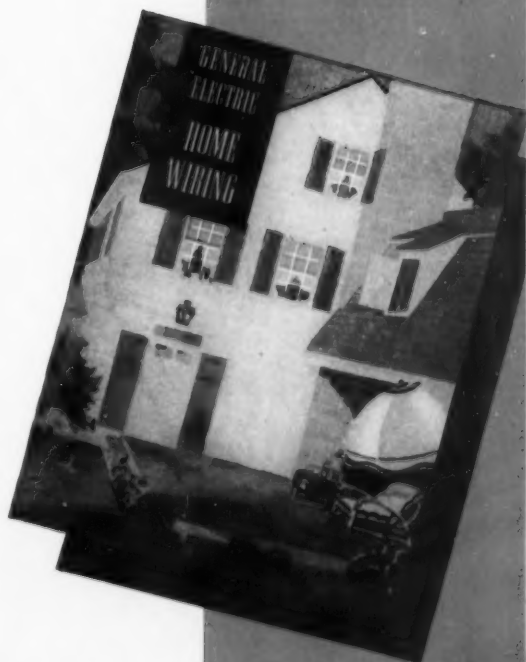
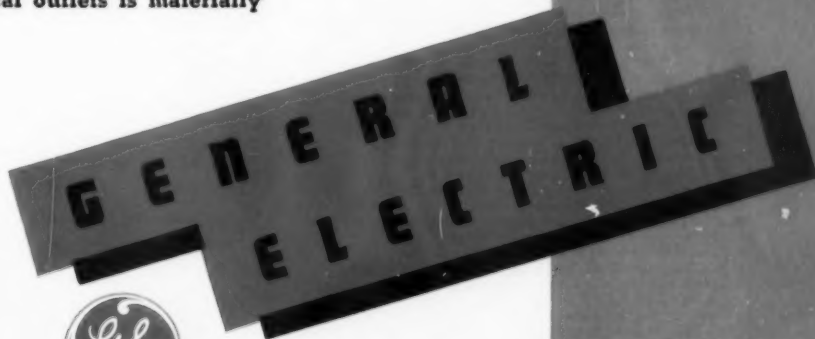


et of the Special purpose outlets will interest customers and help to increase the size of
repla—Radio Outlet GE3022, Clock Hanger Outlet GE2942, Fan Hanger Outlet GE3035.

G-E HOME-WIRING*

25, 30 G-E Home Wiring is described in the bulletin illustrated here together with facts
which you can use in talking with customers to prove the necessity for adequate
wiring. G-E Home Wiring provides wiring for future as well as present needs. It is
adaptable to any size or type of home or other small building. It assures proper wire
size, efficient layout of wiring and ample outlets. Obtain your copy and information
about G-E Wiring Materials from your G-E Merchandise Distributor or write to Section
73, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

*G-E RADIAL WIRING SYSTEM.



GENERAL ELECTRIC DISTRIBUTORS

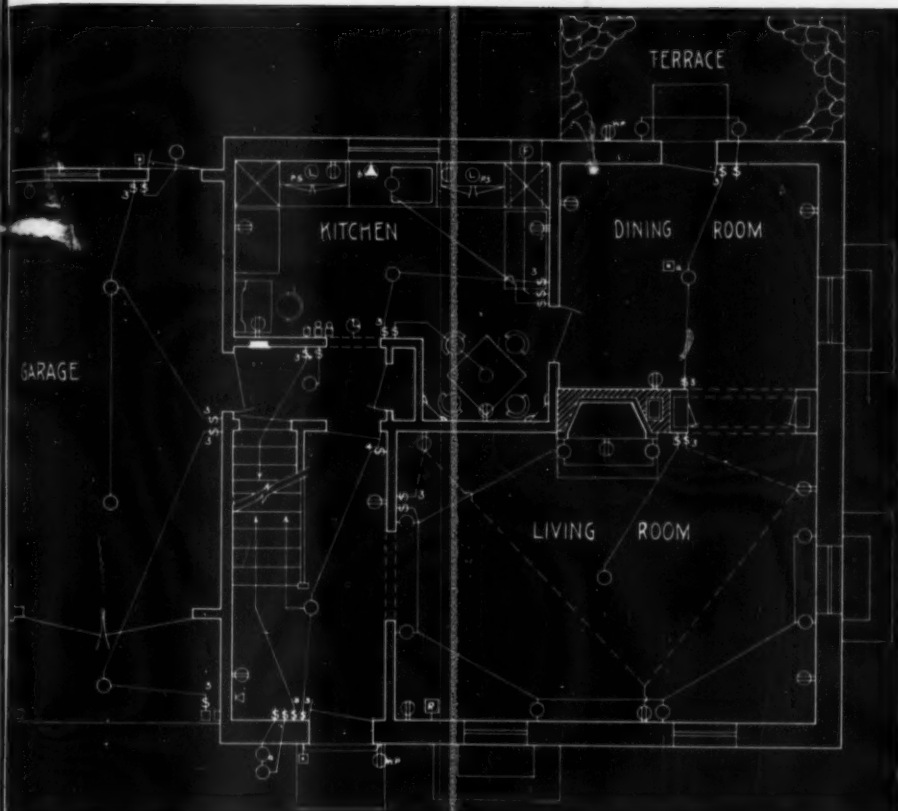
All parts of the country are served by local G-E Merchandise Distributors.
Send your requests for information to the G-E Distributor nearest you.

Ala., Birmingham—Matthews Electric Supply Co.
Ala., Montgomery—Matthews Electric Supply Co.
Ariz., Phoenix—G-E Supply Corporation
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Cal., Long Beach—G-E Supply Corporation
Cal., Los Angeles—G-E Supply Corporation
Cal., Oakland—G-E Supply Corporation
Cal., Sacramento—G-E Supply Corporation
Cal., San Diego—G-E Supply Corporation
Cal., San Francisco—G-E Supply Corporation
Colo., Denver—G-E Supply Corporation
Colo., Denver—Hendrie & Bolthoff Mfg. & Sup. Co.
Colo., Pueblo—Hendrie & Bolthoff Mfg. & Sup. Co.
Conn., Bridgeport—G-E Supply Corporation
Conn., Hartford—G-E Supply Corporation
Conn., New Haven—G-E Supply Corporation
Conn., Waterbury—G-E Supply Corporation
D. C., Washington—G-E Supply Corporation
Fla., Jacksonville—G-E Supply Corporation
Fla., Miami—G-E Supply Corporation
Fla., Tampa—G-E Supply Corporation
Ga., Atlanta—G-E Supply Corporation
Ga., Savannah—G-E Supply Corporation
Idaho, Boise—G-E Supply Corporation
Ill., Chicago—G-E Supply Corporation and branches
Ill., Chicago—Hawkins Electric Co.
Ill., Chicago—Metropolitan Electrical Supply Co.
Ill., Decatur—Morehouse & Wells Co.
Ill., Peoria—Universal Electric Co.
Ill., Quincy—Crescent Electric Supply Co.
Ill., Rockford—G-E Supply Corporation
Ill., Springfield—G-E Supply Corporation
Ind., Evansville—G-E Supply Corporation
Ind., Fort Wayne—Protective Electric Supply Co.
Ind., Indianapolis—G-E Supply Corporation
Ind., Muncie—G-E Supply Corporation
Ind., Richmond—Richmond Electric Co.
Ind., South Bend—South Bend Electric Co.
Ind., Terre Haute—Advance Electric Co.
Ia., Burlington—Crescent Electric Supply Co.
Ia., Davenport—Crescent Electric Supply Co.
Ia., Des Moines—G-E Supply Corporation
Ia., Dubuque—Crescent Electric Supply Co.
Ia., Mason City—Crescent Electric Supply Co.
Ia., Sioux City—G-E Supply Corporation
Ia., Waterloo—Crescent Electric Supply Co.
Kan., Wichita—General Electric Supply Corporation
Ky., Lexington—G-E Supply Corporation
Ky., Louisville—G-E Supply Corporation
La., New Orleans—G-E Supply Corporation
La., Shreveport—G-E Supply Corporation
Me., Bangor—G-E Supply Corporation
Me., Portland—G-E Supply Corporation
Md., Baltimore—G-E Supply Corporation
Mass., Boston—G-E Supply Corporation
Mass., Boston—Milhender-Alex Elec'l Co.
Mass., Lynn—Des Roberts Elec'l Sup. Co.
Mass., New Bedford—Mendell Electric Supply Co., Inc.
Mass., Springfield—G-E Supply Corporation
Mass., Worcester—G-E Supply Corporation
Mich., Battle Creek—Central Electric Supply Co.
Mich., Detroit—G-E Supply Corporation
Mich., Detroit—Frank C. Teal Company
Mich., Grand Rapids—G-E Supply Corporation
Mich., Kalamazoo—G-E Supply Corporation
Mich., Lansing—G-E Supply Corporation
Mich., Muskegon—Fitzpatrick Electric Supply Co.
Mich., Saginaw—G-E Supply Corporation
Min., Duluth—G-E Supply Corporation
Min., Minneapolis—G-E Supply Corporation
Min., Minneapolis—Peerless Elec'l Co.
Min., St. Paul—G-E Supply Corporation
Miss., Jackson—G-E Supply Corporation
Mo., Joplin—G-E Supply Corporation
Mo., Kansas City—G-E Supply Corporation
Mo., St. Louis—G-E Supply Corporation and branches
Mont., Billings—G-E Supply Corporation
Mont., Butte—G-E Supply Corporation
Neb., Omaha—G-E Supply Corporation
N. H., Manchester—G-E Supply Corporation

N. J., Atlantic City—Kay Electric Supply, Inc.
N. J., Jersey City—G-E Supply Corporation
N. J., Morristown—G-E Supply Corporation
N. J., Newark—G-E Supply Corporation
N. J., Newark—E. B. Latham Co.
N. J., Paterson—G-E Supply Corporation
N. J., Trenton—Tab Electric Supply Co., Inc.
N. M., Albuquerque—Hendrie & Bolthoff Mfg. & Sup. Co.
N. Y., Albany—Havens Electric Company
N. Y., Binghamton—Southern Tier Elec. Supply Co.
N. Y., Buffalo—G-E Supply Corporation
N. Y., Elmira—Southern Tier Electric Supply Co.
N. Y., Glens Falls—Glens Falls Elec. Supply Co.
N. Y., Jamaica, L. I.—Central Queens Elec. & Lighting Fixture Corp.
N. Y., New Rochelle—Royal Eastern Elec. Supply Co.
N. Y., New York—G-E Supply Corp. and branches
N. Y., New York—E. B. Latham Co.
N. Y., New York—Royal Eastern Elec. Supply Co.
(also Borough of Brooklyn and Long Island City.)
N. Y., Niagara Falls—G-E Supply Corporation
N. Y., Poughkeepsie—Electra Supply Co., Inc.
N. Y., Riverhead—L. I. Central Queens Elec. & Lighting Fixture Corp.
N. Y., Rochester—G-E Supply Corporation
N. Y., Syracuse—Langdon & Hughes Electric Co.
N. Y., Utica—Langdon & Hughes Electric Co.
N. Y., White Plains—G-E Supply Corporation
N. C., Charlotte—G-E Supply Corporation
N. C., Raleigh—G-E Supply Corporation
N. Dak., Fargo—Dakota Electric Supply Co.
O., Akron—G-E Supply Corporation
O., Canton—Furbay-Sommer Electric Co.
O., Cincinnati—G-E Supply Corporation
O., Cleveland—G-E Supply Corporation
O., Columbus—G-E Supply Corporation
O., Dayton—G-E Supply Corporation
O., Toledo—G-E Supply Corporation
O., Youngstown—G-E Supply Corporation
O., Zanesville—The Roedel Co.
Okla., Oklahoma City—G-E Supply Corporation
Okla., Tulsa—G-E Supply Corporation
Ore., Portland—G-E Supply Corporation
Pa., Allentown—G-E Supply Corporation
Pa., Erie—G-E Supply Corporation
Pa., Harrisburg—Raub Supply Co.
Pa., Johnstown—G-E Supply Corporation
Pa., Lancaster—Raub Supply Co.
Pa., Philadelphia—G-E Supply Corporation
Pa., Philadelphia—Elliott-Lewis Electrical Co., Inc.
Pa., Pittsburgh—G-E Supply Corporation
Pa., Reading—G-E Supply Corporation
Pa., Scranton—G-E Supply Corporation
Pa., Williamsport—Lowry Electric Co., Inc.
R. I., Providence—G-E Supply Corporation
S. C., Columbia—Perry-Mann Electric Company
S. D., Deadwood—Hendrie & Bolthoff Mfg. & Sup. Co.
Tenn., Chattanooga—G-E Supply Corporation
Tenn., Knoxville—G-E Supply Corporation
Tenn., Memphis—G-E Supply Corporation
Tenn., Nashville—G-E Supply Corporation
Texas, Abilene—G-E Supply Corporation
Texas, Amarillo—G-E Supply Corporation
Texas, Dallas—G-E Supply Corporation
Texas, El Paso—G-E Supply Corporation
Texas, Ft. Worth—G-E Supply Corporation
Texas, Houston—G-E Supply Corporation
Texas, San Antonio—G-E Supply Corporation
Utah, Salt Lake City—G-E Supply Corporation
Va., Norfolk—G-E Supply Corporation
Va., Richmond—G-E Supply Corporation
Va., Roanoke—G-E Supply Corporation
Wash., Seattle—G-E Supply Corporation
Wash., Spokane—G-E Supply Corporation
Wash., Tacoma—Home Electric Company
W. Va., Bluefield—Bluefield Supply Co.
W. Va., Charleston—Virginia Electric, Inc.
W. Va., Wheeling—Gee Electric Company
Wis., Appleton—G-E Supply Corporation
Wis., La Crosse—G-E Supply Corporation
Wis., Madison—Crescent Electric Supply Company
Wis., Milwaukee—G-E Supply Corporation

GENERAL ELECTRIC

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT



FIRST FLOOR—A layout providing some extra comforts. But further conveniences can still be sold to suit that family. (From the Handbook of Interior Wiring Design)

Lights can be turned on from one or two places and cannot be turned off by the regular switches. This control is easy with 3-way in place of SP switches and 4-way in place of 3-way.

14. DOOR CHIMES—Women dislike loud bells and buzzers, so sell chimes. They increase the wiring job.

15. GARAGE OPENER—Add automatic garage door openers to the wiring layout. It means the installation of a motor, controls and wiring. The door can be opened automatically or by a switch on the side of the driveway.

16. HOUSE NUMBERS—The illuminated house number is usually forgotten, but it pays for itself in comfort to guests. It adds another outlet.

17. BASEMENT SERVICE—Do not neglect the basement. Outlets are needed for workshop, playroom, dark-room and other uses. Extra outlets for light as well as convenience are easily sold. In addition make provision for heating and laundry.

18. EXTRA CAPACITY—With the use of electricity increasing month by month, your customer will appreciate an extra circuit, provided when the cost is slight.

Store Planning

A large variety of electrical equipment is available for store use. It provides a very profitable field for elec-

trical contractors. Showcase lighting, show window lighting and electric signs all offer changes for selling up. The electrical equipment found in modern drug-stores, butcher shops and grocery stores, calls for many outlets. Other small machines, refrigerators and

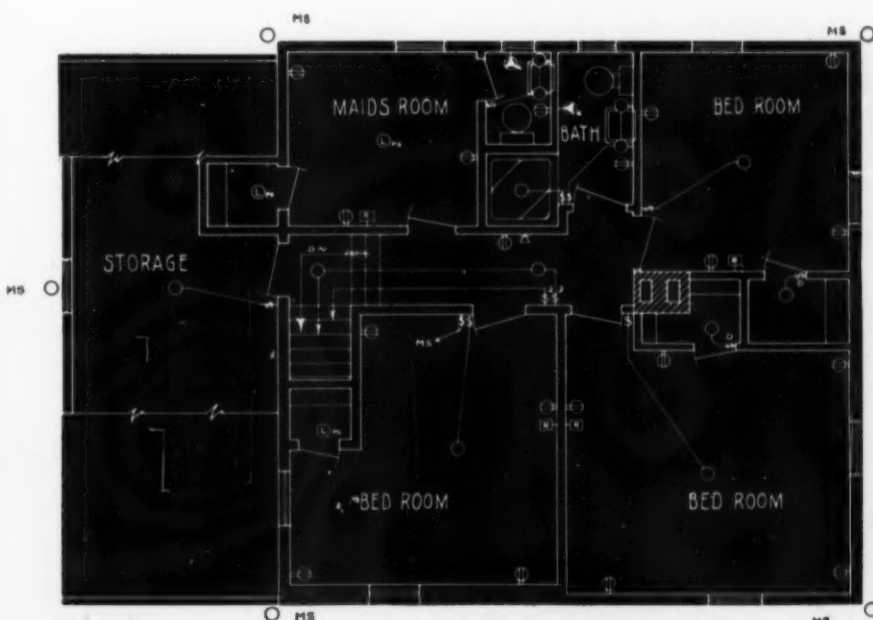
heating devices are used by other merchants. Check up their needs and show how to install and control these machines most conveniently. It means wiring business. And check these other points—

19. GENERAL ILLUMINATION AND SPOTTING—Most stores, not built in the last two years, have too low a level of illumination for present standards. They need equipment for spotting or high-lighting counters and displays. Adequate wiring to the many points, where light may be required on occasion, will not only increase the number of outlets but means the use of heavier copper and more circuits on your job.

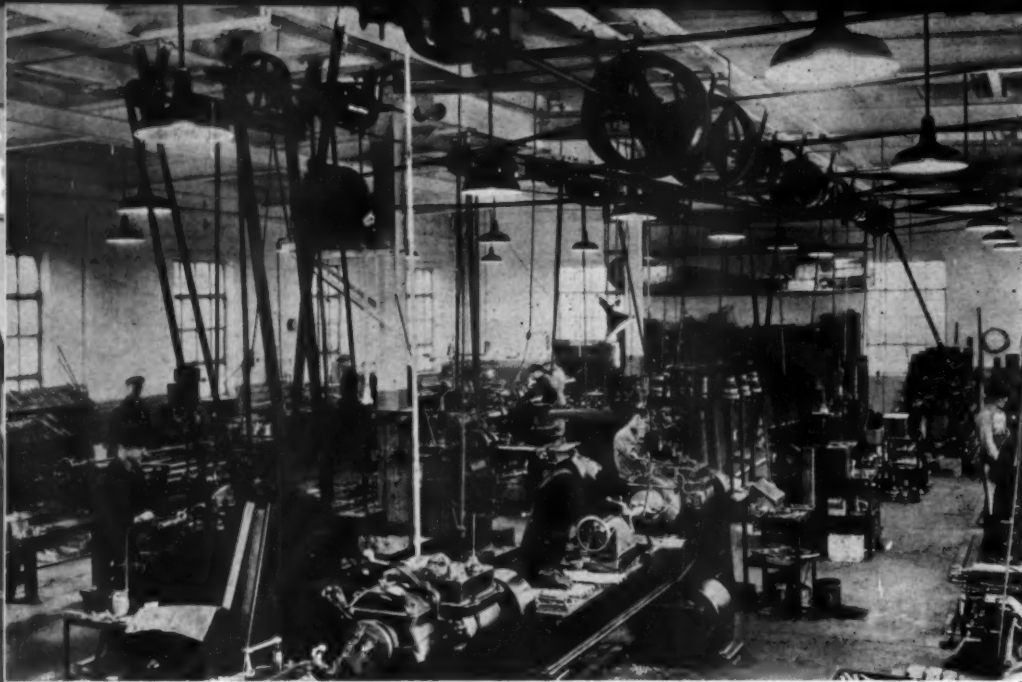
20. WINDOW AND SHOW CASE LIGHTING—Well lighted windows and show cases help the merchant sell to such a degree that it is not hard to sell him what he needs. The wiring for it must be well planned to give a variety of uses. Try circuit breakers to control those locations. They act as fuse and heavy duty switch and avoid ugly large panels.

21. TIME SWITCHES—To provide well lighted window and store interiors that go on selling after business hours, automatic time switches are needed. They are easy to install and add substantially to the value of the installation.

22. ELECTRIC SIGNS—Uses of electric signs have increased so tremendously, every modern store needs large signs outside and smaller ones inside. Electric sign work is a specialty. But any electrical contractor who knows his business, can handle some of this kind of work. Try the stores in your own neighborhood.



SECOND FLOOR layouts can also be built up from this minimum standard of adequacy. (From the Handbook of Interior Wiring Design)



FACTORY WIRING varies as to machine layout and lighting needs. Small jobs may be planned from rough sketches to show provisions for flexibility, adequate feeders, panel-boards and circuits.

23. VENTILATION AND REFRIGERATION—Refrigeration is in general use in grocery stores, butcher shops and similar establishments. Ventilation by means of electric fans is not so often seen in smaller stores. It is becoming steadily more vital in merchandising, because people won't trade in discomfort. Exhaust fans will open a big wiring field.

24. WIRING FOR SMALL MACHINERY—Some stores use small machinery steadily in their daily business, such as meat-cutters, coffee-grinders, bread slicers, electrically lighted scales, cash register and office equipment. In wiring stores, suggest plenty of outlets on the counter or backwall, so that more of this machinery can be used, when it is bought, without having expensive rewiring jobs.

25. BURGLAR AND FIRE SYSTEMS—Not many of the smaller stores think of burglar and fire alarms. Show how either one or both often repay their installation cost in lower insurance rates.

27. FLEXIBILITY—Every factory changes the location of equipment. So a wiring system must have flexibility or it will be practically useless in a short



PERMANENT IDENTIFICATION — This decalcomania emblem goes on all certified installations. (A. W. Bureau material)

time. To provide this flexibility sell underfloor raceways, if the building is suited for this type of installation, or

busways or wireways. Before starting a job discuss this with customer and the wiring materials, which should be used on this specific job to give best results.

28. FEEDERS—The size of the feeders should be carefully considered. A factory adds continuously to the equipment on hand. Feeders may become too small and dangerous a year or two from now. Explain to every factory owner and builder that feeders, sub-feeders and final circuits should be large enough to carry a great deal of increased load.

29. PANELBOARDS—Selection of panelboards is governed by the size of the feeders and the equipment which is fed from these panelboards. But the location and number of panelboards in the factory is a matter of planning and intelligent selling. It is also a question what type of panelboards should be installed. Should it be circuit breakers or fuses? And which will best provide for the uninterrupted operation of the plant? These points should be brought out when you discuss the plans with your customer.

30. SUFFICIENT LIGHT—Often the builder or owner of a small factory does not realize the advantages to be gained from good lighting. Invariably the original specifications call for fewer outlets than are actually needed. Consult available illumination data. Get the power company's advice and help. Suggest a lighting layout right for the specific type of work.

31. HAZARDOUS LOCATIONS—Certain departments on a factory floor may come under the classification of hazardous locations. Sometimes it is not very easy to decide whether a certain process comes under this classification or not. Consult the local inspector and after he decides, insist that all the wiring in this area is installed in conduit, boxes and fittings, approved for this use.

32. SPARE CIRCUITS—It is absolutely necessary to install spare circuits in factories of any size. The main panelboard should have space available for one or two extra feeder circuits at best. Each subpanel should be designed so it is easy to add one or several circuits in case new equipment is installed.

Small Factory Wiring

The wiring of small factories depends so largely on the type of work done, it is difficult to make specific recommendations. The contractor's job falls clearly into wiring for light and wiring for power. But there are still ways to build up the wiring job, by better planning in the customers' interest. Here are six suggestions—

26. PLANS—Small factory jobs need plans, if the contractor is to do a good job. This does not mean elaborate drawings. Make sketches and notations as to light sources, location of panelboards, size of wire, type of wiring material and number of wires in the cable or conduit. It will help sell an adequate job to your customer. It will save you time, money and headaches.

MODERN MERCHANTISERS have streamlined interiors for which tailor-made electrical layouts must be developed. Small motors, built-in lights, cases, and high intensity illumination all require adequate planning.



Celebrating 50 years

of **PROGRESS
DEPENDABILITY
QUALITY**



1888 The First Push-Pull Switch...
Patented by Bryant

1938 Fifty years ago Walter Calvin

Bryant founded the Bryant Electric Company. "Superior Wiring Devices" was the inspiration of this organization... a motto that today has become a familiar part of the Bryant emblem, and a recognized quality of all Bryant devices.

From a small group of eight men, this company has grown to number more than fifteen hundred workers. From eight original products, the Bryant line now embraces more than two thousand devices... devices to meet the many modern needs of commercial, industrial and residential wiring.

Today, as always, whenever you select a Bryant device, you can be sure of the most in quality and dependability.

EVERY OUTLET DESERVES A BRYANT DEVICE



**SOLD THROUGH
ELECTRICAL WHOLESALERS**

**INSTALLED BY
LEADING CONTRACTORS**

**SPECIFIED BY
DISCRIMINATING ARCHITECTS**

THE BRYANT ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT

NEW YORK 100 East 42nd St. • CHICAGO 844 West Adams St. • SAN FRANCISCO 325 Ninth St.

Laying Out The EXPENSIVE HOUSE

IN principal, the electrical layout of an expensive house should not differ greatly from that of a small home. Both must have an adequate number of outlets and switches. Both must have adequate copper in service entrance and branch circuits, so that electricity can perform safely.

The main difference between the small and expensive house might be in the use of more equipment in kitchen and laundry. There is a larger total load too caused by cove lighting, high intensity floor and table lamps and air conditioning. Often a bit of extra planning is profitable at these points.



HOME GUIDE—"Check your Wiring" folders for home owners. The story is convincing. (A. W. Bureau material)

not always the best thing to use however, since modern ranges, with the skirt to the floor, leave very little room for the range plug.

3. APPLIANCE CIRCUIT—The refrigerator, dishwasher, and garbage disposal unit should have their own appliance circuit. Sometimes it is permissible to install two of these devices on one circuit but never all three. So when a kitchen is planned, be careful to provide for these circuits in the service entrance or subpanel.

4. LIGHTING—General illumination in the kitchen should, of course, be of a high level to light up every working space and every corner. The center ceiling light should be



switch-controlled from every entrance to the room. A wall switch controlled light should be over the sink and, if necessary, another directly over the range. Frequently lights under the cabinets and over the work counters, are of great value. They should be explained and sold.

5. PLUG-IN-STRIPS—Multi-outlet assemblies, providing either a continuous outlet or individual outlets every 6, 12 or 18 inches, have found much favor in modern kitchen layouts. This is especially useful over work counters. As fairly heavy appliances are used on these outlets, they should be installed on special appliance circuits.

6. EXTRA OUTLETS—In every modern kitchen there should be also a number of outlets for miscellaneous purposes. A clock-hanger outlet should be above one of the doors. If a regular kitchen ventilator is installed, wiring must connect the fan and switch. If a standard fan is used, a switch-controlled fan-hanger outlet should be installed.

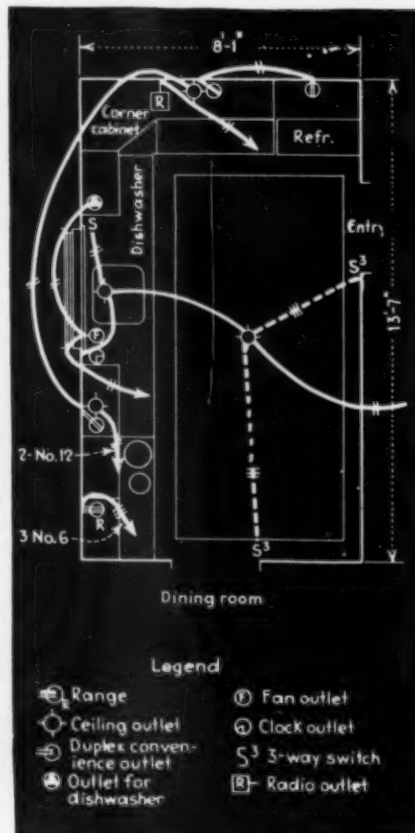
1. Planning the Kitchen

The kitchen in a modern home has changed more in the last few years than anything else in the house. The extensive use of electricity here presents a real problem, and a profitable one, to electrical contractors. High wattage electrical heating, motorized equipment and service lighting make the kitchen the load center—the power house of the home. Here are some points to check—

1. SERVICE ENTRANCE—It is impossible to wire for a modern kitchen without knowing everything about the total connected load. So as far as the electrical contractor is concerned, kitchen planning begins at the service entrance, or better still, at the transformer. For this reason, be sure, whenever you estimate on a kitchen layout, to include adequate service entrance cable and equipment.

2. RANGE—Protection for the range feeder is usually built into the service entrance equipment. These feeders should in no case be smaller than No. 6. Certain locations also demand disconnecting means for the range at the same floor—even in single family dwellings—and if possible near the appliance.

In these cases a range receptacle or fused switches or circuit breaker must be installed. Range receptacles are



KITCHEN ADEQUACY calls for liberal circuiting for appliance loads. Keep lights and controls separate.

2. Planning the Laundry

In the more elaborate home of today the laundry is usually a separate room. This room must be wired so that all the electrical conveniences can be used with the greatest possible comfort. Lights must give illumination where it is needed most. Outlets and switches must provide for safety and flexibility of use.

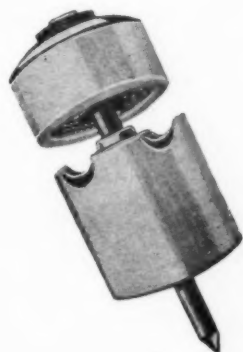
7. WASHING MACHINE—The outlet for the washing machine, of course, must be near the laundry tubs. The contractor may provide a single, convenient outlet suspended approximately 6 ft. above the floor on a heavy rubber cord. This gives plenty of leeway for moving the washing machine and keeps the appliance cord off the floor.

Or, the owner may prefer a three-pole outlet for the two wire circuits about 42 in. high. With this type of outlet, it is possible to ground the washing machine frame, very desirable on account of the wet floor in the laundry. Outlets of this type should be provided for the iron or ironer and possibly for a hot plate and a clothes dryer.

FOR PROFITABLE AND EASY-TO-SELL WIRING JOBS

Check these features of **PORCELAIN**

**KNOBBS • TUBES • CLEATS
• OUTLET and SWITCH BOXES •
Many Other Insulating Items**



» Recognized as the safest, most nearly permanent and trouble-free wiring system, it insures satisfied customers and later repeat orders.

» Contractor makes more profit on each job—yet consumer gets more convenience outlets for his money creating prospects for greater sales and use of appliances.

» The lower cost to the consumer does not alter the contractor's margin of profit . . . but makes lower bids possible and more jobs available.

» The quicker turnover of Porcelain knob and tube wiring material permits smaller stocks and investments.

» Porcelain permits greater flexibility in wiring layouts . . . easier to handle in old or new buildings, both rural and urban.

» It permits you to do a more elaborate wiring job for the same money . . . or an adequate one at lower cost.

On every call you make . . . talk and sell Porcelain Insulated Wiring! Send for the Fact Manual—an instruction booklet on Porcelain insulated wiring which can be used in interviews with architects, home builders and home owners.

STANDARD ELECTRICAL PORCELAIN

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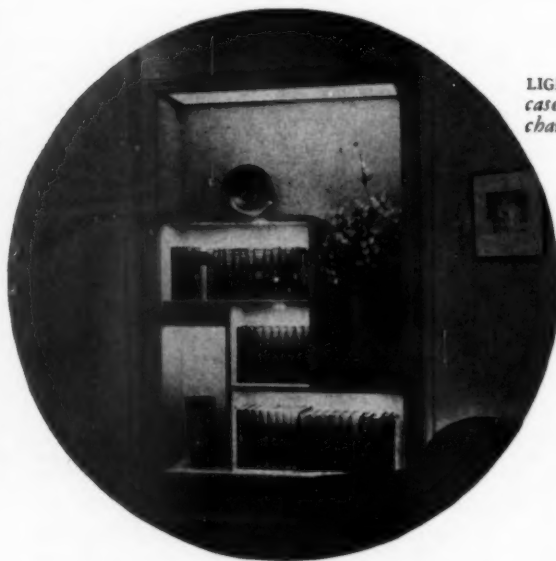
Porcelain Products, Inc., Findlay, O; Parkersburg, W. Va.
Specialty Porcelain Works, East Liverpool, Ohio
Superior Porcelain Co., Parkersburg, West Virginia



PLANNED KITCHENS call for liberal use of copper for appliance circuits, apart from good lighting.



WORK CENTERS of the home are planned for step-saving. Here plugging strip for appliances, handy telephone and shelf radio give this convenience.



LIGHTING REFINEMENTS, as bookcases and recessed units, add charm and also increase the wiring job.

YARD LIGHTING brings safety at all seasons and reveals the garden and other outdoor features.



WIRING—HOW TO SELL IT

LAUNDRY LOADS are increasing. This requires outlets that insure efficient and safe operation.



8. LIGHTING CIRCUIT—A ceiling light is needed, controlled by a wall switch, near the entrance. A light should be installed over the laundry tray or tubs, and over the ironer or ironing board. All these lights should be controlled by wall switches, located conveniently. But in many cases pull chain control will serve the purpose.

9. APPLIANCE CIRCUIT—The laundry needs at least one special appliance circuit serving the iron or ironer outlet. But a second circuit supplying the washing machine, will avoid flickering the lights and probably other minor inconveniences.

3. Appliance Circuits

No fixed rules can be laid down for the number or the size of appliance circuits. No house will use exactly the same number or variety of appliances. But in most cases the contractor will be able to determine the correct number and the correct wire sizes of these circuits. He knows the loads, the local ordinances and existing standards.

Several of the more obvious appliance circuits have already been discussed. But there are other locations in the house where appliance circuits should be installed but usually are not.

10. BREAKFAST NOOK AND DINING ROOM outlets should be on a special appliance circuit—of not less than No. 12 wire. In either room toasters, waffle irons, chafing dishes may be used. An appliance circuit of proper capacity will speed up the cooking operation, save unnecessary voltage losses and keep the lights from flickering or dimming.

11. BATH ROOM—Special circuits are needed to bathroom heaters. These heaters are usually high wattage equipment and call for No. 10 wire at least. Even if the bathroom heaters are not installed, when the house is being built, it will be wise to suggest that the wiring should be installed.



PATH O' LIGHT SWITCHING is worth a lot in any house. Explain it to the customer and it sells itself.

12. WORK SHOP—If there is a workshop in the house, it should have a special circuit. Workshops usually employ a number of motorized tools for which one or possibly two appliances circuits might be necessary.

In larger residences there may be reason also to install circuits for a

water pump, an oil burner, stoker or for air conditioning. Sometimes a special circuit for the garage equipment will be necessary. As said before, it is up to the contractor to use his own judgment when the layouts are made. In any case, some appliance circuits are absolutely necessary. They will make a profitable addition to the installation.

4. Extra Control

The large residence will usually have larger rooms, longer hallways and more stairs and will naturally need more control facilities than the small house. Many 3- and 4-way switches should be provided. Special controls should be furnished for cove lighting to make it possible to change the intensity of the light. Master switches and switched outlets call for special consideration.

Master switches should be installed in every large home. The installation is simple and no special equipment is needed. As said before, a 3-way or 4-way switch installed on the feed end of a 2-point or 3-point controlled light is all that is necessary. A single circuit from the panel or subpanel will connect all these switches with the master control switch. Switch controlled receptacles, as mentioned, are a great convenience in the social rooms of the house. Circuit breakers give an extra switch control for whole sections of the house.



SIMPLE STORY that sells the adequate wiring idea to your prospects, in primer form. (A. W. Bureau material)

SELLING THE WORKERS—This poster belongs where electrical employees will see it and go to work on the idea. (A. W. Bureau material)

Wiring for Signals and Communication

THE trend of the times is reflected in a growing demand for signal and communication systems in the modern home. Many of the systems not only result in greater convenience to the individual, but actually play a large part in giving service, and increasing safety for the entire household.

Even in the small house ordinary bells and buzzers are being replaced with "pleasant toned" devices. In the medium size, as well as the large and fine home, there is a large market for signal systems designed for convenience, service and protection.

The following equipment may be successfully sold in homes of the various sizes—

\$6,000.00 Class Home

ENTRANCE—Front door bell or bar chime. Rear door buzzer or bar chime. Combination bar chime for front and rear doors. Loudspeaking telephone outside of front door with handphome in kitchen.

BASEMENT—Thermostatic detector units near furnace and in built-in garage, with alarm bell on floor with sleeping quarters.

\$15,000.00 Class Home

ENTRANCE—Front and rear door combination tubular chimes. Loudspeaking telephone outside of front and service doors,

with handphome in kitchen. Burglar alarm on front and rear doors.

DINING ROOM—Combination floor push with extension cord and button to table, with tea bell, buzzer or drop on annunciator as signal in kitchen. Burglar alarm system on windows.

MAIDS ROOM—Extension buzzer with cut-off switch from front door signal, or annunciator.

NURSERY—Burglar alarm on windows and door of room, signal bell in maids rooms and master bed room. Photo-electric protection, with signal to maids' rooms and master bed room.

BASEMENT—Thermostatic detector units near furnace and in built-in garage, with alarm bell in kitchen and on floor with sleeping quarters. Burglar alarm on doors and windows.

ATTIC—Thermostatic detector units on ceiling or rafters, with alarm bell in kitchen and on floor with sleeping quarters.

Large and Fine Home Class

Possibilities for equipment already listed plus—

Intercommunicating telephones
Centralized control electric clocks
Paging annunciators—throughout
Radio, individual or centralized
Photo electric control or door between dining room and kitchen
Burglar alarm—automatic type
Microphone protection



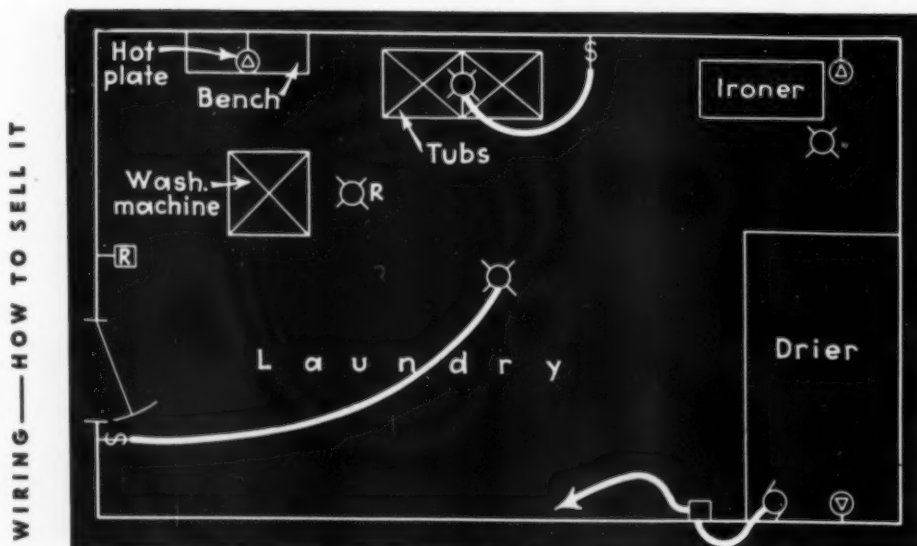
NEWSPAPER ADS reach everybody, and good copy pays. Use these mats. (A. W. Bureau Material)

Photo electric protection
Safe protection
Thermostatic control for bath room heaters
Tank water level systems
Sirens for fire and burglar alarms

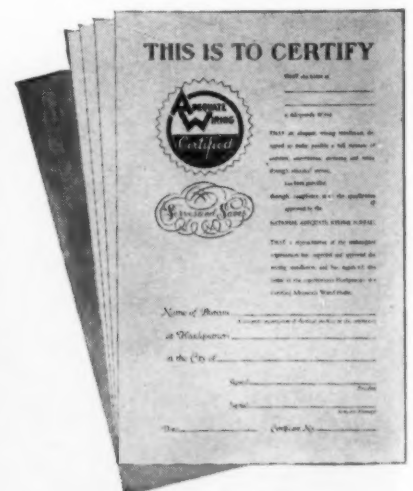
Hospitals, Schools and Factories

Extensive markets also are waiting in institutional buildings, stores, offices and factories. Each situation calls for specialized application of available equipment. Adequate data and experience is at hand. All it needs is selling. With each installation goes a wiring job.

LAUNDRY POWER should be well planned. Decide on equipment locations before heavy-duty outlets are placed



WIRING—HOW TO SELL IT



OWNER'S CERTIFICATES of adequate wiring are an asset to the property. Issued by local Adequate Wiring Bureau. (A. W. Bureau material)

MORE NEWS!



A·C CIRCUIT BREAKER

Trip Free 1 1 1 1 1

THERMAL TYPE

Again **FA** scores with a new product that's different—the **FA** Thermal Type AC Circuit Breaker that operates with the same ease as an ordinary tumbler switch. . . . It is trip free—non-closeable on overloads and short circuits.

There are two distinct advantages incorporated in this newest, exclusive **FA** development:

- (1) It assures automatic, positive protection against short circuits or sustained overloads.
- (2) It is designed with the proper time lag characteristics that prevent needless circuit interruptions when momentary overloads occur.

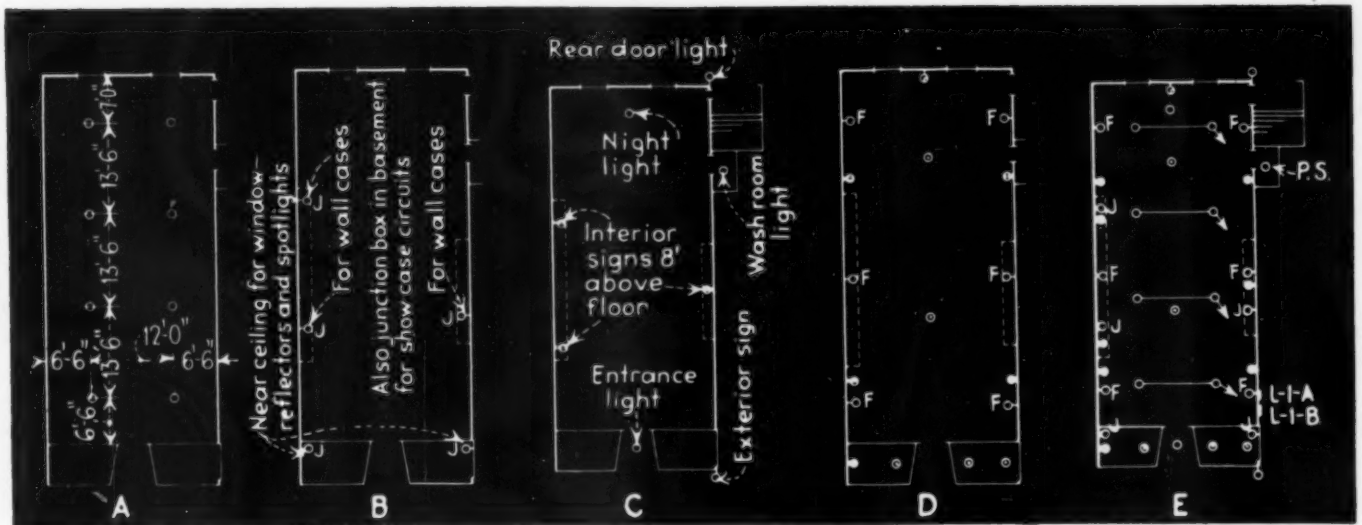
The New **FA** AC Circuit Breaker is specially adapted to range and service equipment protection—and light and appliance branch circuit panelboards, up to 40 circuits. . . . It is small and compact—completely enclosed in a Bakelite housing—attractively designed—neat in appearance.

For 125 volt AC service. . . . Capacities, 5 to 50 amperes. . . . Write for full details.

AUTOMATIC TRIP AUTOMATIC RESET

When an overload or short circuit occurs the **FA** Circuit Breaker is automatically tripped—the tripping action automatically causing the handle to move to the "OFF" position. . . . With the same action, the thermal element of the breaker is automatically reset—which means that it is only necessary to return the handle to the "ON" position to restore service.

Frank Adam
ELECTRIC COMPANY
ST. LOUIS



STORE WIRING requires step-by-step consideration to provide for different kinds of outlets. In the Handbook for Interior Wiring Design, these logical steps in planning are followed—a. outlets for general lighting, b. outlets for connections to window and case lighting, c. outlets for miscellaneous lighting loads, d. convenience outlets, and e. the finished layout with all outlets combined.

Laying Out

The MODERN STORE

WIRING for the modern store focuses naturally on lighting. And the purpose of store lighting is not only to make it possible to see to inspect the merchandise and to avoid fatigue of the employees. It also attracts customers and makes them feel comfortable in the store.

So the wiring for the lighting should be designed to take care of all these purposes, adequately and effectively.

Show Window Plans

Through the show window the casual passer-by receives the first impression of the store. So every merchant—large or small—wants attractive windows. He is willing to accept suggestions that will make his window his best salesman.

In most cases the lighting layout for the modern store is done by the architect or lighting specialist so the selection of reflector equipment and the spacing of outlets is not up to the contractor alone. Nevertheless, the contractor must know the fundamentals of lighting a store so that he can intelligently plan and estimate his job.

When a merchant modernizes or builds a new store, he wants the windows to be as bright or brighter than the store next door. So the location of the store plays an important part in the placing of reflectors. As an aver-

age condition, the following spacing of reflectors is suggested:

Large cities, business district	12"
Large cities, suburban district	12"—18"
Small cities,	12"—18"
Towns	15"—24"

The type of window determines to a large degree the type of reflectors used. Deep windows will normally demand reflectors of the type that distribute the light. Shallow and very shallow windows usually are best suited with reflectors that concentrate the light. Island windows, or windows with glass on both sides, are in general handled as like those of shallow or very shallow type.

As the construction of show windows varies greatly, the method of mounting the reflector changes considerably with windows of different types. Most reflectors are either mounted at the ceiling or transom bar. The most modern and best finished windows have all the wiring and reflectors recessed above the ceiling. Other windows have the reflectors concealed above glass panels. For corners, islands or long arcades, louvres are especially helpful in concealing the light.

For very large windows a combination of standard reflectors mounted near the plate glass, plus ceiling lighting with a pattern is very effective. With special switch arrangements, it will be

possible to obtain a great variety of different lighting effects. The actual wiring for the show windows is best done in wireways. A number of wireways are on the market especially adapted to reflector mounting.

It is good practice to install wires slightly heavier than originally needed. The increase in cost for wires one or two sizes heavier is almost negligible. But if changes of lighting equipment have to be made later on, the cost of changes will be very high. So all windows should be wired in such a way that the greatest flexibility can be achieved.

Another good point is not to have more than 1000 watts per circuit. This will add also to the flexibility.

Convenience outlets should be installed in the background or floor or both. According to the size of windows and its requirements. These convenience outlets will provide circuits for portable lamps, floodlights or motor-driven displays.

Display Case Wiring

The display of merchandise in the interior of a modern store is practically as important as the display in the show window. So the interior displays are generally treated the same way as windows. Showcases and wall cases are as a rule nothing but small show win-



Trol-E-Duct

BULL DOG

PORTABLE

ELECTRICITY

ON WHEELS

UNIVERSAL TYPE



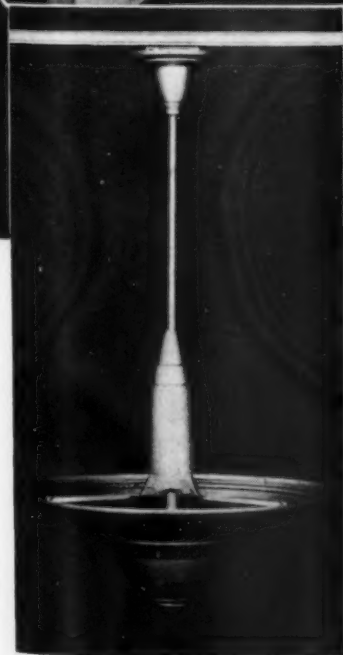
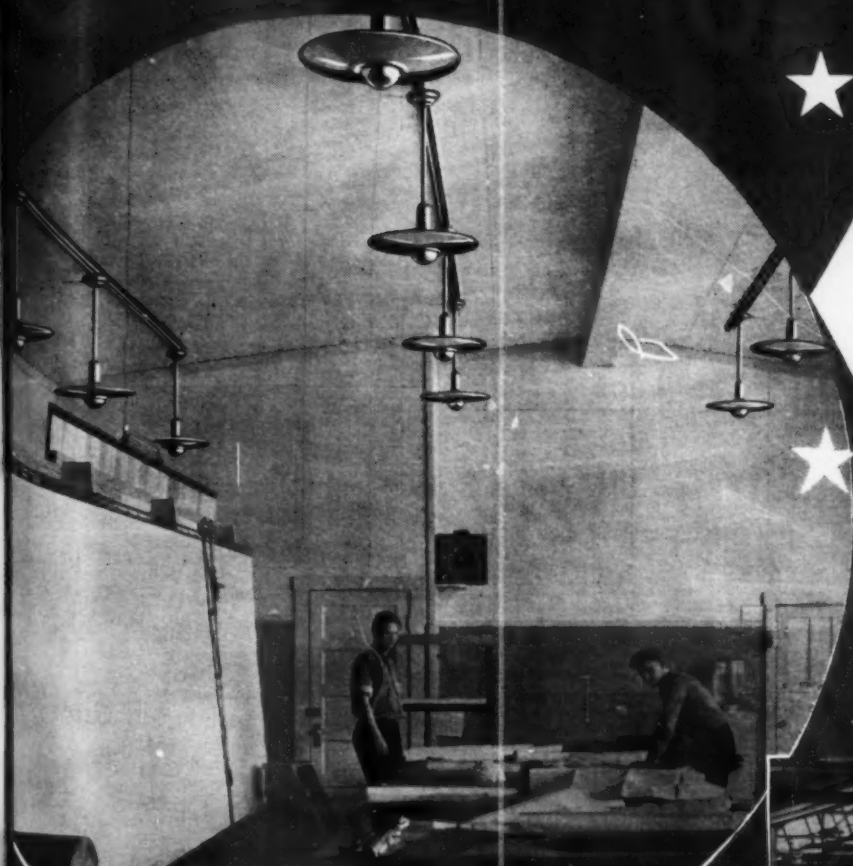
BRINGS **Light** TO THE VISUAL TASK

Universal Trol-E-Duct permits Lights to be readily moved and concentrated on this huge Drafting Board for inspection of detailed sketches of body designs, drawn to full size.

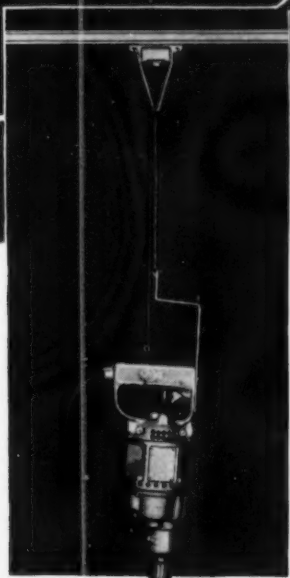


BRINGS **Power** TO THE ASSEMBLY BENCH

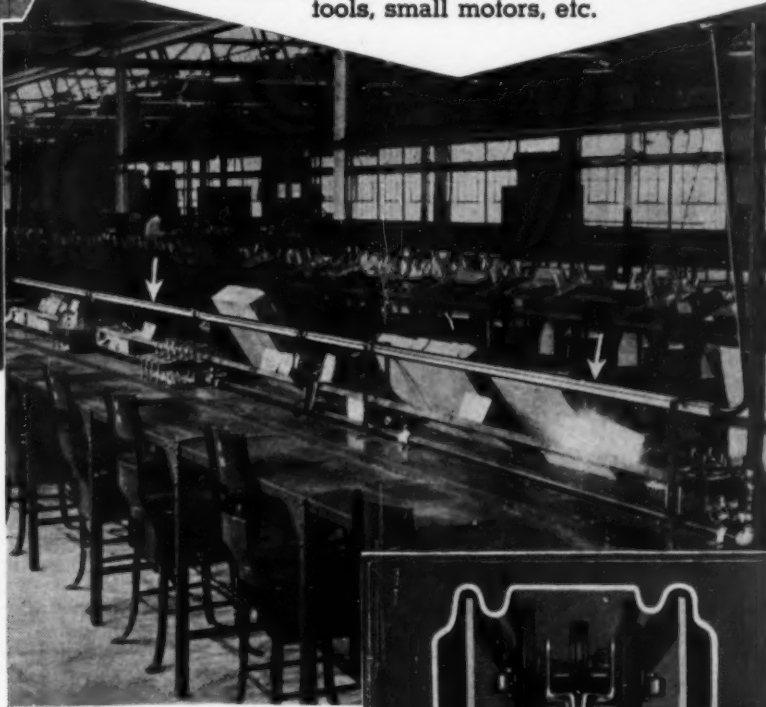
Short or long runs of Universal Trol-E-Duct may be installed over Assembly Benches, as in this Radio Manufacturing Plant to provide a portable, convenient and safe source of Power for electric tools, small motors, etc.



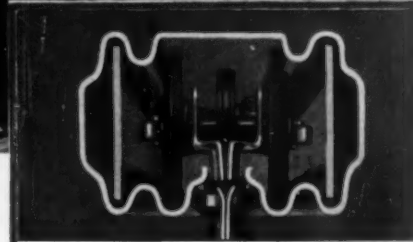
Indirect Lighting Fixture wired to Terminal Type Trolley and inserted in Duct.



Portable Electric Tool connected to and suspended from Receptacle Type Trolley, inserted in Duct.



Right: Cross Sectional View showing Rolling Trolley (or Twist-out Plug) inserted in Duct.



Write For Illustrated Bulletin

BULL DOG ELECTRICAL PRODUCTS COMPANY

Pioneers of Flexible Electrical Distribution Systems

dows. They require from 2 to 4 times as many footcandles of illumination as the general illumination surrounding them. They are quite generally lighted with tubular or lumiline lamps but wall cases are best illuminated by small parabolic aluminum trough reflectors or other light concentrating equipment.

In order to obtain a level of illumination in the show case of 50 to 100 footcandles, 40 to 60 watts per running foot will be required. For counter, tables, island displays, use continuous trough reflectors mounted 3 ft. above the display with 40 to 60 watt lamps 10 to 15" apart. This will produce from 50 to 100 footcandles on the display.

Counter Lighting

For high lighting of counters or table displays, lens spots on columns or mounted on ceiling brackets are recommended. Louvered concentrating reflector spotlights are recommended when a less sharply defined beam seems more effective. To emphasize small vertical displays, racks or stands, like the ones frequently used for ties, small bracket type reflectors with lumiline or regular tubular bulbs are often useful.

For counter and shelf displays foot-light type trough lighting is often employed. These troughs extend in length from single lumiline reflectors to the length of the entire shelf. Equipped with changeable luminous sign panels, they make original appealing displays.

In lighting rug racks, the lighting units should be aimed at the lower third of the rug. Concentrating reflectors will give racks of this type a fairly uniform light from top to bottom. Many different types are available and 150 watt lamps, spaced on 2 ft. centers will provide 30-50 footcandles.

Color Matching

From 50 to 100 footcandles will be necessary for displays where colors and textures have to be examined. Displays of this kind are generally used in women's and men's clothing stores. To obtain light about equivalent to the daylight near a door or window, use parabolic metal trough, 8 to 12 feet out from the displays, with 60 to 100 watt lamps, 12-in. spacing.

There is, of course, a great variety of other applications for light for display purposes. Each type of display needs its own planning.

Decorative lighting for the modern store depends to a very large degree on the architectural design of the store. Every decorative lighting installation is therefore a custom-built job.

The Approach to LARGER BUILDINGS

Selling larger buildings is really easier than selling small ones. There are always definite plans and specifications. There is an architect. There is plenty of money available to be spent for what ever is shown to be the best for that job. The question is will more or less be allocated to the electrical installation? That's where the contractor can do his selling. And the trend of the times is for us—

1 APARTMENT HOUSES are going up again, and more of them are putting in electric cooking. Built-in decorative and high-wattage portable lighting is now in demand, and calls for better electrical layouts. Tenants want good radio reception, which makes radio antenna systems popular for new apartments. Also with the rapid development of efficient room air conditioners, provisions for this equipment cannot be overlooked. Also for protection against intruders, two-way telephones or speakers.

2 OFFICES are efficient only to the extent that employees can work in comfort. This calls for lighting systems giving 25 foot candles or more of correct illumination. To provide high intensities feeders and circuits must be wired to permit the use of larger wattages per square foot of area. After lighting, other facilities should include convenient outlets for office machines, air conditioning, signaling, intercommunication. Here are talking points.

3 FACTORY WIRING may look simple at first glance, but here too the contractor finds opportunity for many recommendations. For factories must always plan ahead for increase in production. There must be capacity for larger machines, more motors, more intensity, heavier loads. Over taxed feeders, crowded conduits and unsightly wiring extensions must be avoided. The possibilities for more efficient use of better drives and control, for sight saving in work rooms, for time and waste saving by more effective signal-

ing or for some use of electric heat must be explored. It calls for selling every step.

4 DEPARTMENT STORES are only small stores magnified into many departments with more need for display—plus all the electrical services to elevators, conveyors and other specialized power and lighting applications.

5 INSTITUTIONAL BUILDINGS call for elaborate wiring systems, each depending on the nature of the institution. Here signaling often is highly developed, as in a hospital. Or there may be unusual lighting needs. In every case there is a chance for the contractor to study what refinements of service can be provided and to build up the wiring job to greater service and profit.

The approach to large buildings is a selling approach—backed by a lively curiosity and a bit of imagination, so ask these questions of yourself—

1. Are the electrical outlets laid out in a practical arrangement?
2. Do the wattages per outlet provide enough illumination?
3. Have circuit groupings been planned for future wattage increases or more outlets?
4. Are feeders inadequate, panelboards too small, conduits too small?
5. Can tenant changes or other space alterations be made at reasonable cost?
6. Has proper allowance been made for future motor loads?
7. Are spare raceways available for signaling, telephones, and future needs?
8. Can tenants install air conditioning systems without extensive changes to feeders, distribution and metering.

The answers show you where to sell. Larger buildings can use good ideas. And they offer ample reward.



IDEAS NEEDED—These bigger jobs are pre-planned but there is lots of chance for selling to increase the wiring job.

The Name **APPLETON**

Insures Wiring Satisfaction



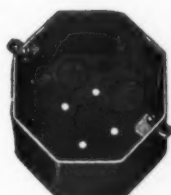
Type "FSC" Unilet



Connector for
Electrical Metallic
Tubing



Type "GRUSE"
Explosion Proof
Unilet



OCR—3 1/2-in.
Concrete Box



Coupling for
Electrical Metallic
Tubing



Type "C"—Form 35
Unilet



Type "H" Unilet



Locknuts and
Bushings



Connector for
Armored Conductors



4-in. Oct. Outlet Box



Type "LB"—Form 35
Unilet



Type "C"—Threaded
Rect. Unilet



Type "LL"—No-Thread
Rect. Unilet

● Through years of practical experience in the electrical field, Appleton engineers have developed the most economical, convenient and long-wearing type of fittings that can be produced. There is an Appleton Unilet and Conduit Fitting that will meet every wiring requirement. Their construction and design insures a quick and economical finished job, saving valuable time and money. The name Appleton on a fitting insures complete satisfaction. Write for illustrated catalogs and bulletins on the complete line of Appleton Unilets and Conduit Fittings.

APPLETON ELECTRIC COMPANY

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SAN FRANCISCO—655 Minna Street

ST. LOUIS—420 Frisco Building

LOS ANGELES—340 Azusa Street

ATLANTA—203 Luckie St., N. W.

CLEVELAND—214 Hippodrome Bldg.

APPLETON UNILETS

Reg. U. S. Pat. Off.

and CONDUIT FITTINGS

STANDARD FOR BETTER WIRING

THE BIG JOB AHEAD—

Modernizing Old Wiring

THE best market for wiring today is not new buildings, as most people seem to think. There maybe 2,000,000 new homes built, in the next few years and so many stores, offices and factories. But there are a large part of 22,000,000 homes needing more outlets and heavier circuits right now! And there are perhaps 500,000 commercial buildings and 100,000 factories waiting to be modernized.

Here is the real market for wiring. Here the big selling job must be done. Here wait the best profits for the electrical contractor. The work is ready for you in every community in the land. This market of course breaks down into two parts, which must be sold in different ways—

1. The Mass Market in the Home

From over half to three-quarters of the houses in any city are now prospects for more outlets, more copper. At least one quarter of the houses can be sold immediately. In the whole country that means better than 5,500,000 wiring jobs—a lot of business.

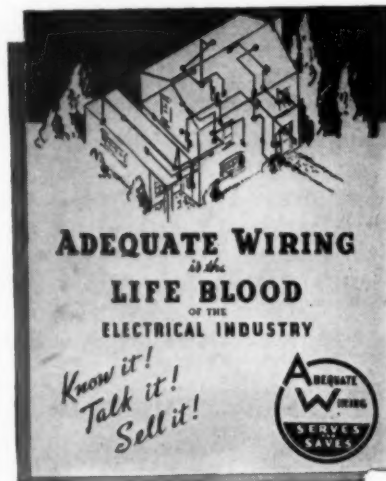
But this business will not come up and ask any contractor to please do it. And it will not be produced by a little desultory advertising and a few calls around or few leads from the power company. And it will not be created by a local cooperative campaign that just talks about the comforts of electric service and the advantages of adequate wiring. That must be part of it. But in addition an idea has got to be sold in a big two-fisted way.

If you want to see how it can be sold, look at Better Light—Better Sight. For twenty years electrical men had been talking to John and Mary about better lighting and they were never interested. They would not buy. And then God gave us the light meter. It became possible then to demonstrate *poor light*. And that is a whole lot more interesting to people than talking about better light.

So the power companies sent out an army of girls and men to show everybody everywhere *how bad* their lighting was. And John and Mary saw the point. They have already bought 3,000,000 I.E.S. Lamps. You know all about that.

A GADGET NEEDED—Well, we must sell wiring the same way. We need another gadget, to demonstrate poor wiring. We want to quit talking about “adequate wiring”, and show people that the wiring in their own house is bad.

And, of course, it *is bad* in most houses, because there is not enough copper. Therefore, the lights flicker when the refrigerator goes on. And the voltage is generally down. That means less brilliance for the lamps, slower toasters, roasters and percolators and many kilowatt hours wasted in heating up wires. This costs the family both money and comfort.



EMPLOYEE COOPERATION — A colorful poster to tie electrical employees into your Adequate Wiring Bureau's drive. (A. W. Bureau material)

To show them this in a simple, effective way, we need a simple gadget. We need a voltmeter with a 1,000 watt load in circuit that will register low voltage on a triple dial, reading in percentage, in brilliance of light, in speed of cooking. Three manufacturers have been working on it. But they all start with a \$40 baby elephant that has to be brought down to a \$10 pocket model. So development takes time. But the gadget is coming—a door opening device for house to house selling.

ORGANIZED GROUP SELLING—For this is going to be a house-to-house job—highly organized, high pressure selling. The contractors, wholesalers, manufacturers and power companies will work together. Under the direction of the local league or com-

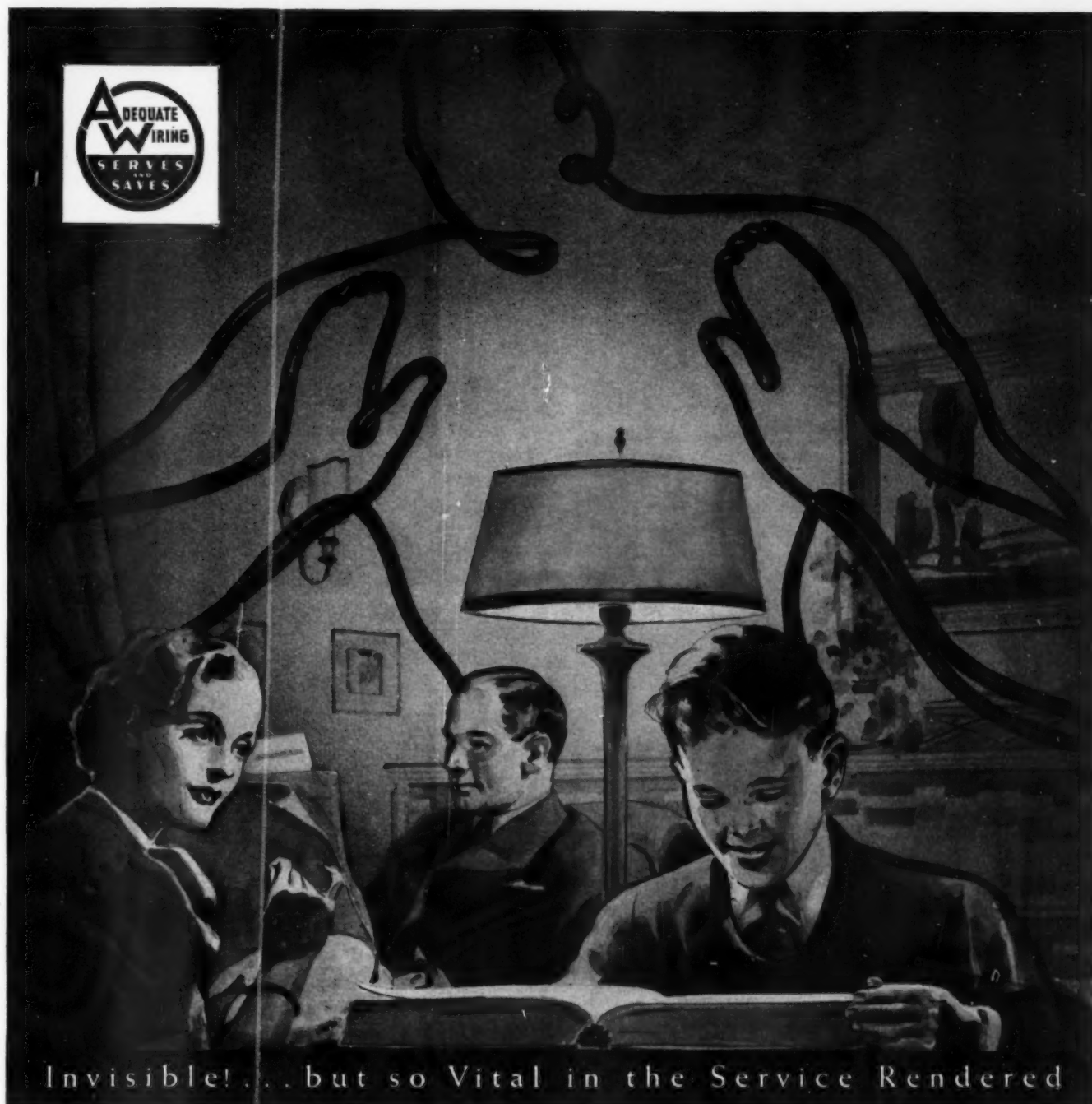
mittee or the power company sales manager, trained men and women will be sent out to call on every John and Mary. They will show them that they are now losing both comfort and money because their wires are tight. The National Adequate Wiring Bureau has already provided most of the material needed for a strong campaign of local advertising to support these salesmen.

This local advertising and sales campaign will be financed by money raised at the local banks on a note. The note will be signed by the several contractors who will do this wiring and probably by the power company. This money will be repaid by a small per cent charged on every wiring job. So the campaign will stand on its own feet, as any business should. The whole program will be set up to sell and wire 25 per cent, or 50 per cent of the houses in town and clean it up in a year.

MASS PRODUCTION WIRING—To wire 10,000 or 25,000 houses in a city in one year, will call for a new kind of job organization. It must be done on a mass production basis with installations completed quickly, at minimum cost. There must be volume enough for each contractor, who specializes in this work, to pay him a good profit and justify the investment in preparation.

Every contractor in town will not participate in such a campaign. Only men with financial resources, engineering experience and adequate organizations can swing it. So perhaps six or ten contractors in a city will go in for it. They will hire and train perhaps 300 to 500 unit wiring teams of two men each. Each ten teams or so, will be supervised by a foreman with a rolling shop, a truck carrying standardized tools and materials. Work will be done by standardized methods.

All this work, of course, will have to be handled in addition to regular current business. It will be extra work, requiring extra men. To recruit these forces, these several contractors who will specialize in this work, will probably have to draw in available good journeymen and helpers from other cities. To act as job foreman, they will probably hire many local small contractors, now struggling along on lean pickings. The result will be an expert



Invisible!... but so Vital in the Service Rendered

Giant in the responsibility it bears, electrical wiring knows no weariness. Wiring it is that brings life to our electrical comforts . . . The well-wired house prides itself on Guardian Building Wire—a brand of significant QUALITY identification. *

GUARDIAN

FLAME-RETARDING • MOISTURE-RESISTING
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Get to the root of these important changes, new rules and cautions, quickly, with Abbott's NATIONAL ELECTRICAL CODE HANDBOOK. Have this helpful explanation of all code rules constantly at hand. Mail the coupon today.

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force of specialists who can rewire houses at high efficiency and low cost.

When the sales crew has piled up enough orders to provide continuous work for the wiring force, the installing crews will be hired and quickly trained and the work will start. The advertising will continue. The salesmen will keep right on selling. And the good prices that these mass production methods will make possible will open the door to a vast volume of old house rewiring.

When the first 10,000 houses have been modernized, the next 10,000 can be wired, until the situation is cleaned up. This mass production project will then be over, just as it is when some great housing development is completed. But meanwhile, the idea of adequate, full comfort wiring will have been sold to the whole city. The local standard of electric service will have been raised to a new plane. And every contractor in town will have more work than he ever had before, because everybody will want more outlets than before.

Underwired houses will be out of date and unrentable. Speculative builders will raise the standard of wiring adequacy in the houses they build, so they can sell them faster.

2. Commercial and Industrial Rewiring

There is also a great opportunity for rewiring in factories, shops, stores, offices and public buildings. It is just as saleable. In fact it is easier to sell than the house wiring market. That is because you can approach industrial and commercial buildings with engineering facts. In selling to the home the prospect must be moved primarily by emotional appeal. But in business buildings money talks. Facts and figures can be presented to show possible economies. Orders come out of it.

SURVEY APPROACH WITH INSTRUMENTS

Many electrical contractors are doing this very successfully right now. They use the survey approach with instruments. They go into a textile mill or a machine shop and say they want to check up the wiring system and see if there is any money to be saved. Management answers—"O.K."

Then they take a set of instruments or an industrial analyzer and go to work like the doctor. They check for voltage, for power factor. They study distribution, power application and control. They measure lighting intensities and efficiencies. They see what chance there is to speed production, to reduce

spoilage and lost time, to better working conditions. And there are few factories in the country where there are not many of these possibilities.

Then they sit down and figure it all out. They see what savings can be introduced in production costs and operating losses. They estimate the expense of correcting these sources of waste and trouble. They strike a balance and see what benefits will come of it, in terms of profit to the customer.

YOUR PLACE IN THIS MARKET

There are four kinds of opportunities in this waiting market for wiring in any city. Every contractor should decide at once what his place is in this picture—what part he is best fitted to play.

1. One contractor may prefer to specialize in modernizing factories and commercial buildings. He can specialize in that. Lots of business waits.
2. Another may prefer to go into the mass production wiring of old houses. Here is the biggest quick volume, ready to respond to a highly organized campaign.
3. Another may prefer to cooperate in starting group selling in his community to stimulate wiring, then take his profit in selling to the general increased demand for wiring that will result.
4. Another, now wiring houses in a small way for a bare living, may see his best advantage in joining one of the larger contractors, who is in on this big campaign. He may make more money as a crew foreman for a while, and then perhaps resume his contracting in a better market.

Decide what you want to do in this Big Re-wiring Movement that is coming. Then work towards that purpose.

PRESENT THE ECONOMIES

—This done they draw up a proposition presenting all these facts. They set up a demonstration of whatever improved illumination they advocate by putting in a few trial units. They show what can be saved on power bills by better power factor. They install graphic instruments to take a record of conditions as they are and as they propose to correct them. They build up a case for management that compels attention. For this is dollars talking.

Electrical Contracting, March 1938

Ideas & Plans

HELP YOU SELL BETTER WIRING



For their own good, home builders and owners should be interested in wiring systems—can be interested and sold on better wiring if the facts are presented to them. The one man who can do this is the electrical contractor. He holds public trust in his

hands. Home builders depend upon him for advice. In order that he may have selling arguments available, the inside pages of this folder discuss the type of system today's home builder needs—and wants when he knows of its many advantages.

ADDITIONAL COPIES OF THIS FOLDER WILL BE SENT YOU UPON REQUEST

STEEL AND TUBES, INC. • • • CLEVELAND, OHIO

✓ **For Greatest Comfort, Convenience, Economy**

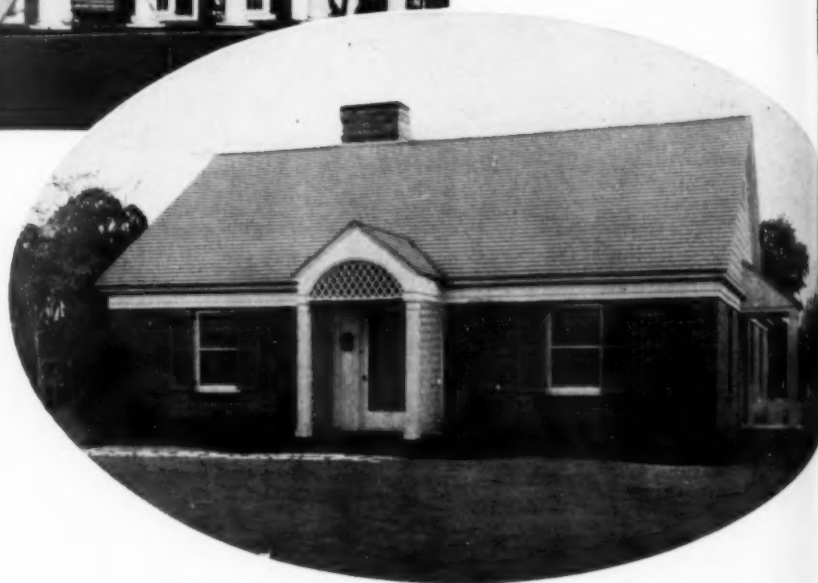
ADEQUATE WIRING IN



At left: All wiring in this modern mid-western home, designed by W. E. Glover, Topeka, Kansas, is protected for a lifetime by ELECTRUNITE Steeltubes (Rigid Steel Raceway.)

* * *

Below: Small homes need safe wiring just as much or more so than large homes. This house, designed by Grayson Gill, Dallas, Texas, is wired in ELECTRUNITE Steeltubes.



Through electricity, home owners and tenants today may enjoy comforts and conveniences unknown just a few years ago—if *their homes are provided with adequate wiring*. Power companies are furnishing increased power at lower cost. Manufacturers are rapidly developing and producing a wide variety of new electrical appliances—many of them taking the place of appliances formerly operated by other means. More and more the world goes electrical. What the future will bring in new developments cannot be foretold.

Electricity is no longer a luxury—it is a low-cost necessity. Today the family in the small home can benefit just as can the family that lives in a mansion. But to enjoy the maximum advantages of electricity, both need adequate wiring—and now both can afford it.

A complete electrical system is just as important as the plumbing system, the heating system, the air conditioning system, house insulation, decoration and fixtures. Yes, and *more important* than many building features which usually are given much thought and long discussion.

THE IMPORTANCE OF STEEL IN MODERN BUILDING

Steel makes possible better buildings. Its high strength, long life and ease of fabrication have resulted in its taking the place of less suitable materials. Reinforcing bars in concrete, joists, pipe, heating and ventilating ducts, furnaces, water heaters, air conditioning units, incinerators, metal lath, windows, doors, cabinets, hardware, bathroom fixtures, wall tile and other building products are made of steel. Each has contributed its share to the improvement of homes. In like manner, rigid steel raceways also have helped to make better buildings possible—have helped the home owner to obtain the full benefit of electricity. The many advantages of a complete electrical system, described on the opposite page, and the low cost of rigid steel raceways should be considered by every person interested in building a new home or remodeling an old one.

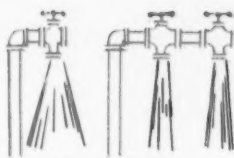
THE ORIGINAL AND PIONEER LOW-COST

Economy and Safety, the Modern Building Needs RIGID STEEL RACEWAYS



PROTECTION AGAINST FIRE

Every day, newspapers carry accounts of fires—many of them caused by a defect in or damage to the wiring system. A single fire can ruin a home—can cause untold damage and financial loss to say nothing of the inconvenience involved after a fire. Rigid steel raceways are fireproof.



THIS or THIS

WIRING IS LIKE A PIPING SYSTEM

Only so much water will flow through a pipe of a certain size. With wires that are too small, the home owner is not getting the full benefit of all the current he pays for. Appliances do not operate at full efficiency. Lighting suffers. A good example is the dimming of lights when a toaster, waffle iron or other heating appliance is turned on.



RIGID STEEL RACEWAYS REQUIRED IN FIREPROOF BUILDINGS

Every city today requires rigid steel raceways in buildings in fire districts. In fact, many cities require such wiring systems in residences. Industrial plants, where thousands of men are employed and millions of dollars are invested in equipment, take no chances. Their wiring systems are enclosed in fireproof rigid steel raceways.



SENSE OF SECURITY

Electricity, handled properly, is one of man's greatest assets. It furnishes light, heat, power, refrigeration, entertainment, etc. But when uncontrolled, its tremendous energy is dangerous. With his wiring system of adequate capacity installed in rigid steel raceways the home owner need never worry about accidents or damage caused by overload, mechanical injury or abuse.



GOVERNMENT HOUSING PROJECTS USE RIGID STEEL RACEWAYS

Government housing projects which provide modern housing at low cost in what formerly were slum districts are being wired in rigid steel raceways.



COST OF HOUSE

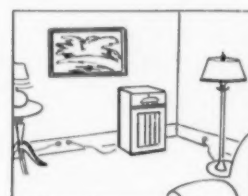
LOW COST

A complete wiring system in rigid steel raceways is not expensive when you compare it with the cost of the building and other systems it contains. With full provision for the future, the cost is but a fraction of one per cent more than old-fashioned methods. Galvanized rigid steel raceways last for the life of the structure in which they are used.



SIX OUT OF EVERY TEN HOMES TODAY ARE INADEQUATELY WIRED

Because 60 per cent of all homes today are old-fashioned in their wiring, owners or tenants cannot enjoy the many advantages and conveniences of electricity with full economy. Many families are taking chances with haphazard attempts to correct inadequacy with exposed extensions, worn out plugs and sockets, and too little copper in circuits.



MORE OUTLETS—GREATER COMFORT

The time to plan for complete wiring is before the building is erected. Sufficient circuits, outlets and switches installed then will save many a headache and many a dollar later on. Today, the comfort and utility of a building as well as the health and happiness of its tenants depend to great extent upon electricity. It should be made available at every needed point.



RIGID STEEL RACEWAYS PROVIDE FOR THE FUTURE

Up to 1915 electricity's chief use was for light. Houses were wired only for that purpose. Since then countless appliances have been developed. No one knows what the future holds. Rigid steel raceways provide a flexible "pull in—pull out" system in which future changes are simple and inexpensive. Once walls or ceilings are filled with insulation materials, additional wiring cannot be installed, except at great expense.



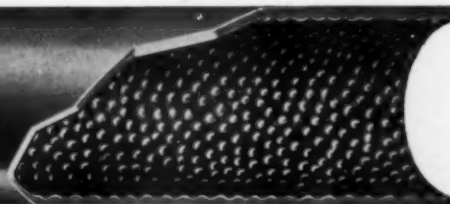
RESALE VALUE

Buildings adequately wired in rigid steel raceways have one more selling point than buildings in which the wiring is insufficient and unprotected. And added selling points increase the opportunity for higher selling price. Complete, trouble-free wiring also means satisfied tenants in rented property.

OTHER ADVANTAGES OF RIGID STEEL RACEWAYS

- Wires can be pulled in or out without tearing out plaster or floor boards.
- Full mechanical protection to current-carrying wires.
- Greatest safety and longest life of any wiring method.
- Fireproof, water proof, rodent proof and tamper proof. Amateur home electricians, handy men or children will not tamper and cause accidents

- or damage in the wiring system when enclosed in rigid steel raceways.
- Rigid steel raceways provide a positive method for grounding.
- Protect wires from contact with combustible or moisture-absorbing insulating materials.
- Make a neat installation.
- Are ideal for telephone wiring—remove unsightly wires.



To obtain greatest efficiency from a wiring system at lowest cost requires not only rigid steel raceways, but the most modern, the most economical raceway. Investigate ELECTRUNITE Steeltubes.

THREADLESS RIGID STEEL RACEWAY ★ ★ ★

... AND HERE'S THE MODERN, LOW-COST,
EASY-TO-INSTALL RIGID STEEL RACEWAY

ELECTRUNITE Steeltubes

Reg. U. S. Pat. Off.



LIGHT WEIGHT—EASY ON THE BACK

ELECTRUNITE Steeltubes was designed for a single purpose—to provide complete and simplified protection for wiring at low cost. It is lighter in weight than old-style conduit—easier to handle, especially when working overhead or in other back-breaking places—easier to take to the job.



EASY TO JOIN

There are no threads to cut—no oil or grime—no stocks, dies or vises to buy—when you use ELECTRUNITe Steeltubes. Three simple fittings—coupling, box connector and adapter—make positive, water-tight joints. There's no laborious steam-fitting job to do—you merely tighten couplings—a wrench or pliers does the trick.



EASY TO CUT

No vises are needed. Merely hold ELECTRUNITe Steeltubes in one hand and a 32-tooth hacksaw in the other. A few strokes and the cut is quickly and cleanly made. What little burr remains may be reamed out with a file, pocket-knife or plier handles. Very few tools are needed with this modern conduit.

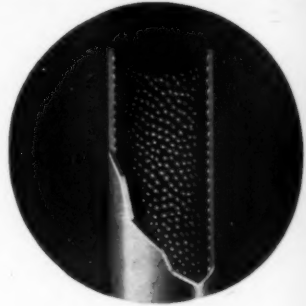


EASY TO BEND

ELECTRUNITE Steeltubes is formed cold—hence, it bends cold easily and perfectly. A simple roll-type bender makes possible a 90° bend in one easy sweep. Short "kicks" and "dog legs" are simple matters. Vises are unnecessary. And it's just as easy to straighten and rebend without distortion or damage.

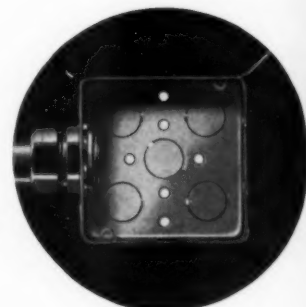
EASY TO WIRE

Wires slide through ELECTRUNITe Steeltubes like "greased lightning." On the inside surface thousands of tiny rounded knobs coated with glass-like clear lacquer reduce drag approximately 30 per cent—reduce the tendency to jam in runs containing many bends. (Patent No. 1,962,876.)



RESISTANT TO CORROSION

ELECTRUNITE Steeltubes will last for the life of the building—because it is protected against corrosion by a positive zinc coating applied in the most modern way—by electricity. The zinc coating will not crack or flake at bends. Since there are no threads to cut, there is no exposed steel to rust and fail at joints—no damage to the protective coating by pipe wrenches or vises.



FULLY APPROVED

ELECTRUNITE Steeltubes has the complete approval of the National Electrical Code (Article 348—1937 issue) for any type of house wiring from service conductors to branch circuit outlets. It is fully approved by the Underwriters' Laboratories—also by the U. S. Government for use in Federal building projects.



NEW LOW PRICES

Investigate the new low prices recently made effective on ELECTRUNITe Steeltubes and fittings. And remember this: there is only ONE genuine. To obtain all of the advantages available in a modern raceway, look for this label and the words "STEELTUBES EMT" rolled into the steel. If your wholesaler cannot supply you, write us.



MORE THAN 175,000,000 FEET INSTALLED IN ALL TYPES OF STRUCTURES



Steel and Tubes, Inc.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND OHIO



Printed in U.S.A.

WIRING—HOW TO SELL IT

Then they recommend an investment and show what the cost will be to finance it separately, to be repaid from savings effected, over a term. They offer to do this job for a flat sum of money, or sometimes for a share of the savings over a period of so many years. And management says—"O.K."

PLANNED SELLING—Many contractors are doing this kind of selling right now. Some are working systematically down through one class of prospects, over the territory they can profitably serve—for example, the textile mills of an area. They become experts on textile mill modernization. Or, they may specialize on metal working industries. Others study their cities and select the best prospects, perhaps first the print shops, then cleaning and dyeing establishments, then the food processing plants and so on. In each case, they learn what can be done in that type of industry and play it through. It pays.

And if it pays in industrial buildings, it pays in commercial buildings too. Office buildings, department stores, storage warehouses, hotels, theaters, apartment houses, garages, small shops also waste money on obsolete wiring systems. Schools, churches, hospitals, libraries and municipal buildings also throw money away, that would be saved if those in charge saw how it can be done. And the contractor can show them.

Wiring can be sold in any city. But it calls for more than just asking for business. Select your prospects. Then plan your approach. Then survey the prospect's conditions. Then recommend improvements and demonstrate the benefits that will come from them. Then make a proposition and get it accepted. Then do the job. Then enjoy the profits.

CERTIFICATION helps you sell. This guarantee of adequacy wins you the customer's confidence. (A. W. Bureau material)



All Porcelain Non-Metallic Wiring Accessories

**NO SHORTS
NO GROUNDING**

by
KNOX

**NO CORROSION
NO ABSORPTION**



For a Dependable Job Insulate all Conductors

The complete KNOX LINE of ELECTRICAL MERCHANDISE consists of some sixteen hundred different items, and is the most complete to be had from any one manufacturer. Again we say "ONE ORDER, ONE SHIPMENT, ONE REMITTANCE" saves time, worry and money.

A CATALOG UPON REQUEST.

**SUPREME
QUALITY**

The KNOX Line will Make 'Em Shine
KNOX PORCELAIN CORPORATION
KNOXVILLE - TENNESSEE

Editorials

Earl Whitehorne, Editor

Code Revives Local Interest

It took a revision of the Code to bring the rank and file of a busy industry together once more. Widespread interest has prevailed at recent meetings held in various towns to discuss the new 1937 Code. These gatherings have included contractors, electrical inspectors, power company engineers and others who play a vital part in everyday wiring activities.

That in itself is a healthy condition. For whenever these groups are drawn together for the common purpose of enlightenment, something worthwhile is bound to come out of it for all concerned.

If this is so, why not go further with the idea? With all due respect to the Code and its importance from an installation viewpoint, there are many other matters of common interest which justify similar meetings. There are, for instance, too few men who know what is in the Handbook for Interfor Wiring Design, although about 30,000 copies have been distributed. Moreover, too few contractors' salesmen and estimators know how to talk to the public about wiring. So there is need for help from leagues, association leaders, wideawake wholesalers and others who will support regular local meetings—schools if you please—on the Art of Selling wiring. It takes good salesmen to get good orders.

There is real need too for a complete contractors sales manual. It should show how to sell residence wiring, commercial and industrial lighting, motors and control, factory maintenance, industrial modernization. But until something like this comes there are interesting ways for contractors to collaborate. And they can secure helpful cooperation from others of the industry.

Already some local associations round up sales data, inspirational articles and news, for discussion at regular meetings. Before the depression nearly every important city had a Code Committee. Certainly every community in which several contractors do business needs a regular get-together on the most vital elements—how to sell, what to sell, how the public benefits. The Code governs installation methods. But jobs must first be sold before contractors need these new rules.

They Put It Up To You

The National Adequate Wiring Bureau has certainly put the bee on the electrical contractor. For years he has been insisting that the industry should do something to create a demand for wiring. And he was right. Now a splendid program has been launched to sell both old and new houses,—and it is up to the contractor to come through.

The style and scope of the A.W. campaign is a stimulating surprise to everybody. It is better and stronger than most of us have had the imagination to hope for. And it is here! It is all that we need in any city to go forward with the job—if the local people do their part.

There should be no such "if" in anybody's mind. But there is. After all, this great program is only—can only be—a tool for men to use. And tools are no good unless willing hands—skilled hands—use them. The tools are vital—but men must do the work. So the A. W. Bureau in providing these tools—has put it up to you.

There is money in this program for every contractor. But nobody is going to bring it to him and put it in his pants. There is just one way he

can get it. It can only come through a well organized local A. W. program, in his town.

It is up to *you*, therefore. And the thing to do is plain and simple. Press for action in your home town. Talk it up to power companies, wholesalers, the other contractors. Insist on action. Do it now!

Readers Demand Tax Revision

In our December issue we published an editorial entitled "Congress Needs Your Guidance Now". It ran as an insert in twenty-three McGraw-Hill papers, signed by James H. McGraw, Jr., president of the McGraw-Hill Publishing Company. The message was addressed to the 400,000 paid subscribers and more than 1,000,000 readers of these many magazines. It asked for frank opinion as to the need for Federal tax revision to speed business recovery.

Post cards were signed and returned by 25,000 men of American industry. Over 500 letters came with them. More than 98 percent of these ballots urged revision of the Undistributed Earnings Tax, the Capital Gains Tax and Surtaxes on Large Personal Incomes. They were sorted, according to Congressional districts and placed in the hands of representatives in Congress, as direct word from home-town voters. Meanwhile, requests have come in for 115,000 extra copies of the editorial and more cards are being received day by day.

This clean cut call for action from so many men is encouraging. These cards were signed by members of every major industry and trade in the country, by civil, mechanical, electrical and chemical engineers, by individuals ranging from foremen up to presidents, in big and little organizations. It is the greatest response to a single editorial appeal that we have ever known. For these men all signed their names to indicate their desires to their own Congressmen. A secret ballot would undoubtedly have greatly increased the response.

We believe this poll of their constituents can not but be impressive to men in Washington. We hope that it will strengthen the demand that has been flowing from American

business everywhere for release from the restrictive taxes now hobbling trade and industry. We hope that it will hasten action in the halls of Congress. For we are convinced that recovery now waits only on confidence that business is to be permitted to do its proper work without fear and make an honest profit.

Too Much Speed in Shop Work

Success in business is often the difference between mob competition and fundamental policies. In the motor service shops it is more than ever important to keep a cool head on the matter of quality versus short cuts. Public demands are for speedy service, to be sure, but in a business like motor rewinding, sane limits must be maintained. Although the average layman is not bothered much about what is underneath the paint, he can kick back—hard.

It is too evident that undue emphasis on hurry-up shop work plays into the hands of chisellers. A public that is trained to think only of the time element can gradually be diverted from considerations of quality. Furthermore, cheap competition is usually cheap because of unfair wages and hours of employment. When unreasonably quick repair schedules are encouraged, unfair competition creeps in on overtime production.

Shopmen must stand firm ground if they are to keep out of the vicious competitive circle. It eventually sacrifices standards of quality for speed. For shops can best sell their services in terms of years of useful life built into rewind motors. Sell what you have installed under the paint.

Let's Give Them a Hand

Through the efforts of R.E.A., facilities are being developed in many states for farm wiring inspection. The need was urgent. The electrical industry was indifferent. So R.E.A. is now doing an important job.

But, inspection is not properly, R.E.A.'s task. All it can be expected to do is put the wheels in motion in

each state, leaving the responsibility in the hands of a competent public official or insurance rating bureau. Then they can refuse to finance unspected premises.

The selection of competent inspectors and strict code enforcement within the individual states is definitely an industry responsibility. In Minnesota, for instance, State Fire Marshal A. N. Nordstrom asked George Garney of the State Board of Electricity, Glenn Rowell of the Underwriters and William Ritt of the contractor's association to recommend standards for the selection of inspectors and uniform rules for farm wiring based upon the Code. The recommendations drawn up assure qualified inspectors and safe wiring. Because Minnesota's electrical industry is well organized these able men were available to lend their aid.

Not all states are so fortunate. Even though an inspection program is organized, the responsible authorities do not always have the benefit of an industry advisory committee. Farm wiring inspection is a technical job. It is up to our industry to see to it that the authorities have the benefit of experienced council in setting up competent staffs, able to enforce safe wiring practice along rural lines.

Back Talk

CNX Error—Tut! Tut!

Our Eagle Eye Department has been busy. In the January issue we told how Detroit has been trying out CNX wiring in houses. On page 55—we said "In a 50 outlet job the cost of CNX averages about \$45 less than the Romex." Fancy now! \$45! It should have been \$1.45. We wrote it right. The printer gumbled it. So letters have been drifting in saying—"How come?" The printer won't apologize so we do—with a red face. Ho-Hum!

Serious Complaint

To the Editor—I have frequently noticed your remarks about the small contractor. I naturally take exception to your attacks on them. Your magazine seems to continually belittle them.

I am not writing this letter to create a fuss, but to present our side of the problem and have your stand further explained. The articles I have read seem to look for ways to squeeze them out of business and do not look on them as legitimate competitors.

I am doing contracting in a small way. No shop, other than a place to keep a little stock and tools. My office is at my home and my shop is my truck. I am a licensed contractor and have been for about 15 years. I have never worked over four men and work with the tools myself. I have always tried to do good work and think I have earned a reputation for being honest and dependable.

In other words about the only difference between myself and a legitimate contractor

(according to your articles at different times) is that I do not work as many men or have a shop. Yet I am able to hold my overhead down below them and also make a fair profit. I have always made a living above the average.

There are many more like myself, who are not pricecutters and are not gyp artists. I do not know how this class of men are classed—as curbstoners, worry-warts or fair competitors.

Do not look at this letter as a personal grudge but an open discussion of the above problem.

A. M. Scruggs
156 Clark Street
Memphis, Tenn.

We are disturbed by this letter. We don't care how small a contractor is. Whether he employs one man or does the work himself, he is entitled to respect. We have not intentionally criticized any man because his business is small—so long as he plays fair and is constructive.

We have criticized that type of small contractor who does his selling largely by talking customers into installing fewer outlets to make a job cheaper than some competitor's figure. That is not constructive. It is not fair. It is not selling. It has done a great deal of harm to all contractors and the entire industry.

If a man gives sound advice to customers, backed by good workmanship and good service, we don't care how small he is. If he is destructive, we don't care how big he is—we're agin him.

Marine Wiring

To the Editor—I have taken Electrical Contracting for quite some time. I think that the magazine could be of more widespread value if you could include some dope on marine problems. As I am personally in that particular end of the work, I happen to know many who would appreciate some magazine which would throw a ball down their alley once in a while.

John G. Wachtler, Chief Electrician,
Luckenbach Steamship Company, Seattle.

A good idea. And by a coincidence, we were planning this two days before the good suggestion came—to develop a marine wiring feature. It is a highly specialized field. But it should be interesting.

Loose Data Sheets

To the Editor—I was sure glad to see that Electrical Contracting was going to present data sheets on maintenance practice. This is just the kind of information we need in our work. I should like to suggest that wiring blue prints be included in this set up. Also arrange the book so the maintenance department sheets can be removed from the book without destroying them so these sheets and wiring diagrams can be filed in a service manual. I think this type of service will be a great help to the contractor. If there is anything I can do to help in this work, let me know.

Clarence Wheeling
Vincennes, Indiana

It's a good idea, but your Uncle Samuel says "Nix!" The second class mail regulations permit no loose sheets nor sheets scarred for tearing out. And Jim Farley looks in every mail bag—believe it or not.

Estimating Service?

To the Editor—I would like to say a word of praise for "Electrical Contracting". It has been a great help to me in my business, as it is the only means I have of keeping in touch with the progress made in the electrical field.

Could you please tell me where I could obtain a complete estimating manual that would help me on figuring jobs? I would appreciate this service very much.

J. E. O'Donnell,
Auburn, N. Y.

Thanks for the encouragement. It helps. As to estimating—the NECA Estimating Manual and Monthly Labor Unit Service is the best thing available. We recommend it to every inquirer.

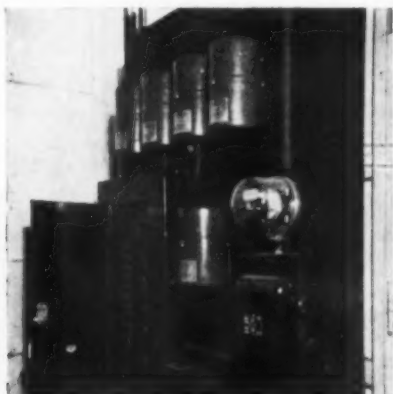
WIRING

Methods

PANEL-MOUNTED BALLASTS

As mercury vapor floodlighting units are becoming more widely applied for gasoline service stations, contractors must plan for the proper mounting of the required reactors or ballasts that go with each H.I.M.V. lamp unit.

Here is a new installation by the E. C. Carlson Electric Co. in



ISOLATED BALLASTS—Reactors for outdoor H.I.M.V. floodlights mounted beside panelboard in gasoline station.

Youngstown, Ohio, with five ballast units installed at the circuit breaker panelboard rather than upon the floodlight poles. In the upper row of four 450 v.a. units, each pair was connected by a $\frac{3}{4}$ -in. conduit nipple to the 26-circuit panelboard. Interconnections were provided with $\frac{1}{2}$ -in. nipples. The 100-amp. service switch and meter socket appear in the right foreground upon a plywood mounting board that accommodates all of the service and distribution equipment.

BOX HEIGHT PRE-SET

The Kieswetter Electric Company of Syracuse, N. Y. avoided nipping up to plug receptacles and switches at the Syracuse Medical College by bending the conduit to fit the exact height of the outlet plus an allowance of one inch for

offset. All receptacles were located at the same height above the floor, allowing the els to be bent up in advance. The same procedure was followed in home runs to the panelboard. The conduits were held in place by a wooden template drilled to match the cabinet knockouts.

DESIGNED FOR ADDING

To provide generous raceway capacity to flush ceiling outlets, and also allow for easy under-plaster extensions later on, the Mellon Institute of Industrial Research at Pittsburgh used a specially roomy box assembly. This photo of a typical box connection shows two 1-in. elbows, stubbed into the back of a $4\frac{1}{2}$ -in. square deep box. The plaster cover has a raised cover with knockouts in the rim to receive future under-plaster extensions, that may be made with oval



FUTURE EXTENSIONS—Box made roomy and provided with plaster cover with rim knockouts for adding under-plaster extensions.

metallic tubing. The swivel-type box cover was used for the self-alignment of various reflector supporting stems. The cover screws do not carry the fixture's weight, as the swivel fitting is attached to a fixture stud, that is fastened to the outlet box.

ORDERLY STORAGE

On a big job in a recently finished Battle Creek, Mich., food factory, the contractor had to take more than usual precautions in organizing his job stock and work space. Central Electric Co. floored over two bays with heavy



WORK SPACE—Planked to protect floors. Racks and shelves provide compact material storage space on the job.

planking and built stock shelves and racks for materials. Pipe machines and vises were set up in this protected area. Tools and materials were stored in orderly array and as many working operations as possible were limited to this space.

SHOWMANSHIP ON THE JOB

A little showmanship mixed in with the prosaic routine of the job may account for thousands of dollars in new business. Robert Y. Chedister, manager of the Midwest Electric Wiring Co., of Denver, has found this out.

"Bob" Chedister achieves his showmanship with paint and when the Midwest is out on a job location the impression is that the circus has come to town. Instead of the usual grimy and work-worn array of tools and tool chests, the Chedister layout displays a battery of brilliantly-colored equipment boxes and tools that gets into the eyes of the casual onlooker.

"Two years ago," says Chedister, "we decided to make ourselves conspicuous on the job. It has been one of the most profitable ideas we ever had. At first, it was just an experiment, to learn if advertising our equipment in this way would have any



"THE ELECTRICAL WORLD IS TALKING *about this* **MERGER"**



WESTINGHOUSE
NOFUZE "DE-ION"
CIRCUIT BREAKER

WESTINGHOUSE
"DE-ION"
LINESTARTER

WESTINGHOUSE
"DE-ION"
COMBINATION
LINESTARTER



It was good news when first announced two years ago. And today, after two years of proved performance, the Westinghouse "De-ion" Combination Linestarter has the electrical world talking—and buying. That's because:

- IT SAVES IN INSTALLATION COST
- IT REDUCES OPERATING COST
- IT'S COMPACT
- AND IT'S SUPER-SAFE

Before you buy starters or circuit protective equipment, be sure to get a copy of the new booklet "4 Points to Check." Here in a few pages you will find complete information about the newest in motor control and circuit protection economies. Simply ask your electrical wholesaler.

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Company, East Pittsburgh, Pa.

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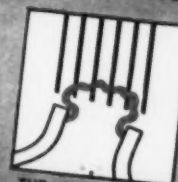
"DE-ION" COMBINATION LINESTARTERS



WHAT "DE-ION" MEANS



THE OLD WAY



THE "DE-ION" WAY

In the past, arcs have been broken by "stretching". The "De-ion" quencher confines, divides and extinguishes the arc almost instantly—obviously preventing burning heat on contacts or arc barriers.

CHECK THESE 9 FEATURES

- FULL SAFETY
- COMPLETE MOTOR AND CIRCUIT PROTECTION
- BI-METALLIC OVERLOAD PROTECTION
- FRONT OPERATING HANDLE
- AMPLE WIRING SPACE
- UNUSUAL ACCESSIBILITY
- COMPACT SIZE
- ATTRACTIVE APPEARANCE
- LOWER INSTALLED COST

MOTORS • LINESTARTERS • CIRCUIT BREAKERS • SAFETY SWITCHES • PUSH BUTTONS

Wherever
you are..



KILLARK SERVICE *is close at hand -*

From St. Louis to strategic points—north—south—east—west—Killark Warehouses reach out to serve wholesalers everywhere. Because of this service set-up, Contractors will find it easy to get Killark Fittings anytime from their source of supply.

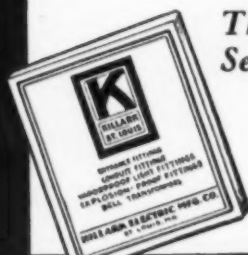
14 Major Distributing Centers

So tremendous has been the endorsement and approval given Killark Fittings that it has been necessary for us to construct a new, larger building—the most modern fittings plant in America—in order to more adequately supply the great demand for our quality products. Fourteen well located cities from coast to coast carry full factory stocks of Killark Fittings—no delay no matter where you are situated. These factory distributors have been chosen because of financial stability and the reputation they have established in their adjacent territories. They are ready and willing to endorse and recommend fittings carrying the "K" trade mark. Use Killark Fittings on that next job!

KILLARK ELECTRIC MANUFACTURING CO.

Vandeventer and Easton Avenues
St. Louis, Missouri

**This catalog is FREE
Send for your copy**



Our comprehensive catalog of the Killark Line, containing prices, styles, and sizes is ready—write for your copy today!

WIRING Methods

[FROM PAGE 73]

direct results. It was soon apparent that we were attracting attention. We began to get jobs because our equipment had made an impression.

"At first, the tool boxes were painted a brilliant orange with the name of the firm stamped on in black lettering. The next innovation was to stamp a description of the type of equipment on the box so that anyone interested might receive an impression of multiple sets of tools. Boxes were marked: 'Acetylene Torch No. 4,' 'Electric Drill No. 3,' 'Hammer Set No. 5'."

So each tool, even to rope ends and block and tackle, is boxed or painted



TOOLS TALK—Bright paint and stencil on these boxes impress customers.

the company color. And in addition to the advertising value, painting the tools has saved \$200 in losses in two years' time.

"There is no question of the ownership of tools when our equipment is lying around with that of the plumber and other workmen," says Mr. Chedister. "Our tools are also conspicuous where the light is bad and we seldom miss one when gathering them together at the end of the day."

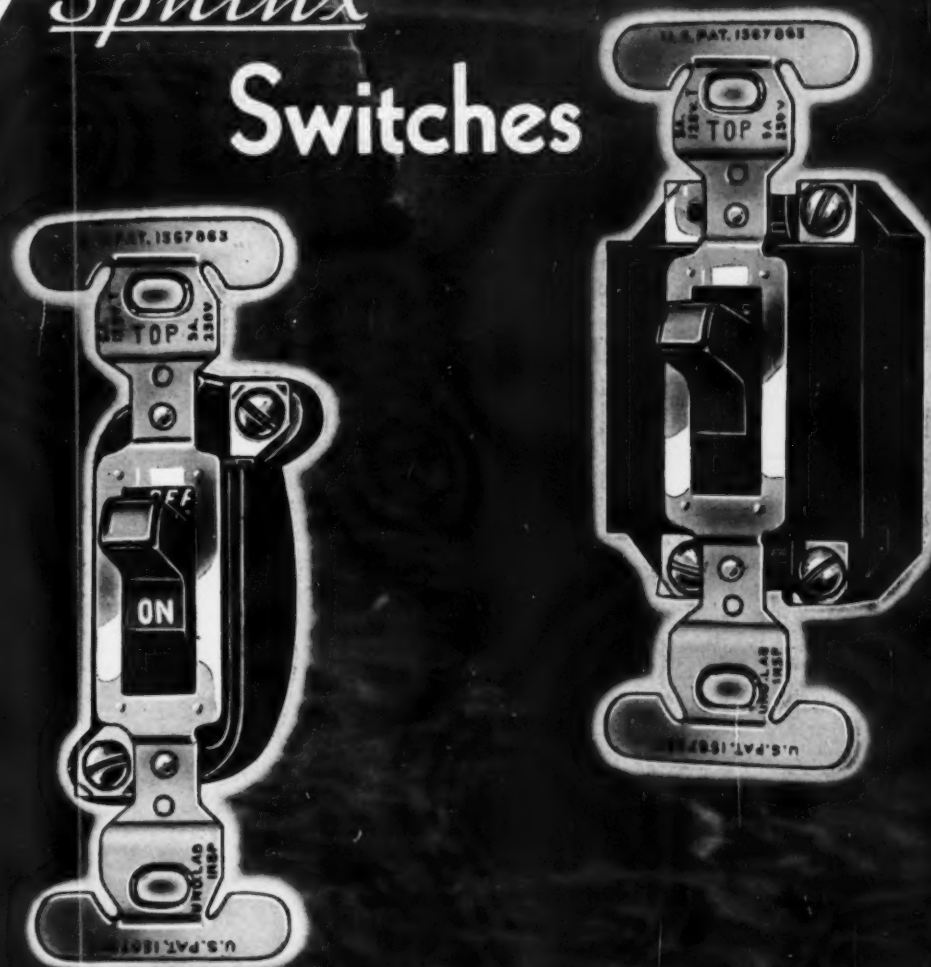
Innumerable jobs have been directly traced to the Midwest's circus-colored equipment. In one outstanding instance, Chedister received a \$6,000 job because an architect was impressed with the completeness and orderliness of his equipment.

The total annual paint bill so far is \$4 because Chedister mixes the paint in his shop. It is composed of red lead, linseed oil, and turpentine which produces the bright orange color used in painting structural iron work. The shop boy re-paints the tools regularly in his spare time. Chedister says that this \$4 investment in paint is the cheapest and most productive advertising he has ever used.

Electrical Contracting, March 1938

H&H

New *Sphinx* Switches



Silent, Mercury Break

At last — a switch with a soft, sliding action; no springs, no blades; silent and vibrationless. Prolonged tests, mechanical and electrical, have proved that the new mercury break ensures exceptionally long life by eliminating parts that commonly wear out. Though silent, its action is positive. Here, then, is the logical switch for hospitals, churches, conference rooms, fine homes and offices where folks want the quiet refinement of high quality.

Sphinx Switches must be installed in vertical position, as marked. Fit standard wall boxes; have plaster ears standard; large-head binding-screws accommodate No. 12 wire. Handles come in brown Bakelite and cream-tinted white IVORYLITE to match plates. Specify Catalog numbers 821 for single-pole, 822 for double-pole, 823 for 3-way, 824 for 4-way with BAKELITE handles. For IVORYLITE add "I" to Catalog numbers listed.

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HART & HEGEMAN DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

ELECTRICAL WHOLESALER



The Jobs you **READ** *about* 



THE ADMINISTRATION BUILDING

TRIANGLE PRODUCTS *exclusively*
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FIRST TO LAST . . .
Triangle products Reward Buyers!

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 ***It MUST be right!***

NEXT ISSUE
 Metro-Goldwyn-Mayer
 Production Studio

WORKING DATA FOR THE JOB

THE speed and skill with which a man can work hangs on his ability to think. And that depends upon his ready knowledge. It is a smart thing, therefore, for any one interested in electrical maintenance to review his basic data occasionally.

To make this easy, we present here this series of background "Guide Sheets" on the electrical apparatus with which the maintenance man must work. The idea is to set down briefly the things he should have in mind in the selection and care of all this equipment.

This "Check-up of Maintenance Practice" began in January with a discussion of the maintenance man's job. Last month covered—

1. ALTERNATING CURRENT MOTORS—Types and Applications

Future articles will discuss—

3. ALTERNATING CURRENT MOTORS—Maintenance
4. DIRECT CURRENT MOTORS—Maintenance
5. A.C. MOTOR STARTERS AND CONTROLLERS—Types, Applications and Maintenance
6. D.C. MOTOR STARTERS AND CONTROLLERS—Types, Applications and Maintenance
7. SPECIAL CONTROL PROBLEMS—Heavy Installations and their Maintenance
8. ELECTRIC DISTRIBUTION—Circuit Protection—Power Factor Correction
9. ILLUMINATION—Types and Applications
10. ELECTRIC HEAT—Large and Small—Types, Applications and Maintenance; Furnaces
11. ELECTRIC WELDING—Types, Applications, Control
12. INTERPLANT COMMUNICATION—Types and Common Maintenance Problems
13. INSTRUMENTS—Types, Application, Care
14. POWER TOOLS AND APPLIANCES—Types, Application, Care
15. BATTERIES AND RECTIFIERS—Types and Special Maintenance Problems
16. ELECTROPLATING—Maintenance Aspects
17. ELECTRONIC DEVICES—Types and Applications

ELECTRICAL

Maintenance

INDUSTRIAL AND COMMERCIAL

DIRECT-CURRENT MOTORS —Uses and Advantages

ALTERNATING current motors are today far more common than d.c. motors, which preceded them by many years. But the latter are by no means out of date. Direct-current motors are desirable and necessary for many industrial applications. Design improvements are constantly being made. So to complete the background story on motor types and applications, begun last month, the following basic d.c. motor facts are presented for review. This article considers d.c. motors most commonly used in industry. This means motors of about 500 hp. and less, with speeds ranging from about 200 r.p.m. to 3,500 r.p.m.

Since a.c. power is in widespread use, a number of questions arise in people's minds when d.c. machines are under discussion. They are—

1. Why do d.c. motors continue to be installed where a.c. motors can be purchased for less than half the first cost?
2. Why do plants served by a.c. power often convert part of it to d.c. power for some drives?
3. What can a d.c. motor do that an a.c. motor cannot do?

Every maintenance man should know the answers.

Briefly the governing factors for the continued use of d.c. motors are:

A. Service Requirements—Because of their easy and exact control at small expense and small sacrifice of efficiency, d.c. motors are best suited to service cycles which require reversing, frequent starting and stopping, heavy peak loads, and wide speed range.

B. Speed Requirements—A d.c. motor

can be operated at various speeds. When set at any desired speed, the motor will run at that speed with little variation regardless of load.

C. Torque Requirements—Direct-current motors can deliver torque up to ten times that corresponding to the rated horsepower or even more. The best an a.c. motor can do is about four times normal or full load torque.

The chief considerations against d.c. motors are higher first cost, slightly higher maintenance cost and greater size in comparison with a.c. motors of corresponding ratings.

The Three Types

The three main types of d.c. motors are 1. *shunt-wound*, 2. *series-wound*, and 3. *compound-wound*. These names indicate the methods of field excitation. Typical diagrams of connections are shown on page 78.

To start a motor, the usual practice is to insert resistance in the armature circuit. Then, by gradually reducing its value, the motor speed is increased to rated or basic speed. For further speed increase, the accepted method is to weaken the shunt field by inserting resistance in the field circuit.

When a speed lower than rated speed is required, resistance can be inserted in the armature circuit. But the speed will vary according to the load.

Another method of obtaining lower speed is to supply to the armature circuit a constant voltage of suitable lower value, usually from a motor-generating set. This latter method



WHERE WIDE SPEED RANGE IS NEEDED—This 35 hp., 230-volt, 250-1,000 r.p.m. d.c. reversing planer motor is direct-connected to a Niles-Bement Pond planer, with automatic control. Direct current is used almost universally for this service, because of the d.c. motor's flexibility and adaptability to wide ranges of speed.



OPERATES AT AN ANGLE—This 2 hp., 1,150 r.p.m. constant-speed d.c. motor is used in the centrifugal casting of bearings. Centrifugal casting increases the density and strength of the metal, and produces a lining free from blow holes. Molten babbit is poured into the upper end of a rapidly rotating shell.

is used also for increasing speed. In both methods the field current is kept constant.

Motors can be obtained with the proper characteristics for any application. This is accomplished by having various electrical and mechanical modifications.

1 Shunt-wound motors have field coils with many turns of fine wire and considerable resistance. The field is connected or shunted across the power lines. The field takes only a small part of the line current. These motors

have large starting and pull-out torques, limited by commutation.

Because of the inherent characteristics of the motor, the speed will vary slightly with change of load and line voltage. The speed will also increase slightly after the motor has been operating for a while. This is because, as the motor heats up from room temperature, the resistance of the shunt field increases.

This type of motor has two subdivisions according to speed—

a. *Constant speed* motors operate at almost the same speed for any load, without

adjustment of the field or armature currents. Some motors can be operated satisfactorily at higher speeds, as much as twice rated speed, by field weakening.

b. *Adjustable speed* motors are designed for a wide range of operating speeds. Standard speed increase is a ratio of 3:1 and 4:1, although motors can be obtained to stand 6:1 speed increase. When once adjusted, the speed remains nearly the same for any load. The motors are brought up to basic speed with full field strength. Increase in speed is obtained by weakening the shunt field.

Standard adjustable speed motors are designed for—

c. *Constant torque*—where horsepower is reduced in direct proportion to the reduction in speed;

d. *Tapered output*—where a slightly higher horsepower is available at maximum speed than at basic speed.

2 Series-wound motors have field windings with a small number of turns of comparatively large-diameter wire or copper bar, capable of carrying the entire current of the motor. The field coils and armature are connected in series. When the motor is operating, one terminal of the field and one of the armature are connected to the power lines.

Speed of the series motor varies according to the current flowing through the armature and field—that is, according to the load. With heavy load, the motor runs at slow speed and has considerable torque. With light load, the motor has a much higher speed and low torque.

With practically no load the speed is excessive and dangerous. Therefore, in order that the motor can never become entirely unloaded and run away, it is always direct-connected or geared to the machine.

Series motors have a very large torque for heavy and frequent starting.

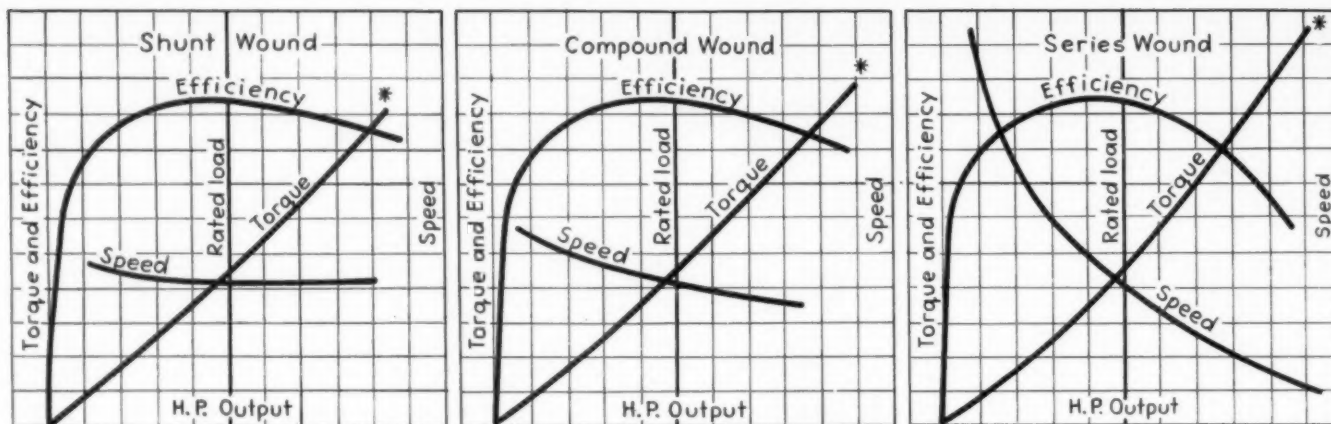
3 Compound-wound motors have both shunt and series field windings, and so they have a combination of the characteristics of the shunt and series motors. If the connections for the shunt field are made at the brushes, the motor is called a "short shunt". If they are made at the motor terminals—across armature and series field—it is called a "long shunt".

General-purpose motors are *cumulative compound wound*. That means that the current in the series winding helps the magnetizing action of the shunt winding.

The speed varies with the load, more so than the speed of the shunt motor, but not as much as the speed of a series motor. The shunt field limits the maximum speed so that the motor will not "run away" when the load is thrown off or disconnected. The series winding provides starting

MOTOR CHARACTERISTICS AND SELECTION CHART

TYPICAL APPLICATIONS	TYPE OF MOTOR	SPEED		STARTING TORQUE IN PERCENT OF FULL LOAD TORQUE	MAXIMUM TORQUE
		CLASSIFICATION	REGULATION		
Fans Blowers Positive Pressure Laundry Washers Flat Work Ironers Stokers Dough Mixers	Shunt-wound	Constant	5 to 10%	150%	Limited by commutation
Fans Blowers Ironer Flat Work Lathe		Adjustable by Field Control	5 to 15% Dependent upon field setting.	150%	
Elevators Passenger Paper Mills		Adjustable by Variable Voltage	Slight	150%	
Cranes Hoists Valves Tum Tables		Varying	Dependent upon the load. Will run away if unloaded.	300 to 400%	
Pumps Centrifugal Displacement Presses Printing Rotary Elevators Passenger Freight Conveyors Car Pullers	Compound-wound	Varying	10 to 25%	175 to 200%	
Crushers Large Band Saws Sanders Rolls Bending Straightening Dough Mixers Laundry Extractors Power Hammers					



* Torque limited by commutation only

COMPARATIVE operating characteristics of continuous-rated d.c. motors.

and pullout torque much greater than is available with shunt-wound motors.

The cumulative compound-wound motor is suitable for heavy starting and fluctuating loads, where constant speed is not essential. It is designed so that the change in speed from full load to no load will be about 20 per cent. However, the motor may be wound for other changes in speed to meet special conditions.

Compound motors also can be obtained with a *differential compound winding*. That means that the current in the series winding opposes the magnetizing action of the shunt winding.

This method of compounding is used to prevent a decrease in speed, or even to increase the speed, with an increase of load to full load.

Except for some very special applications of speed control, differential compound motors are seldom used. This is because the shunt motor operates at a speed sufficiently constant for most applications.

Mechanical Modifications

Locations are a factor in the application of motors. Consequently open motors cannot always be used. However, various mechanical constructions are available to protect active parts of the motor from falling particles, gases, and other destructive elements, that may be present where they are used. Examples are:

1. *Semi-inclosed motors* with screen or grid covers; applicable for machine tools, where metal chips may be flying or falling.
2. *Drip-proof motors* with solid covers on the upper half of the housing; used where motors are subject to dripping water or falling particles.
3. *Splash-proof motors*, practically inclosed, except for openings at the bottoms of end shields. These are applied where a hose with water under pressure is used for cleaning machinery, as in dairies or packing houses.

4. *Totally-inclosed motors* with all active parts inclosed, are required in dust-laden atmospheres, as in coal handling and some chemical plants.

5. *Explosion-proof motors* similar to totally inclosed motors. But they are so constructed that if any explosion occurs within the motor, the expanded gas forced out of the motor will be cooled sufficiently to prevent a disturbance outside of the motor. Their application is in explosive atmospheres, known as Class I, Group D, hazardous locations.

6. *Gear motors* usually built with the gear section and motor as an integral unit. In some cases the gear unit is

designed to permit the use of motors having other mechanical modifications.

7. *Vertical motors* similar to standard motors, except that they are built to operate at 90 deg. from the horizontal. They can be furnished with flange, ring-base or tripod-base mountings or with machined end shield for mounting on bolt circle of a machine.

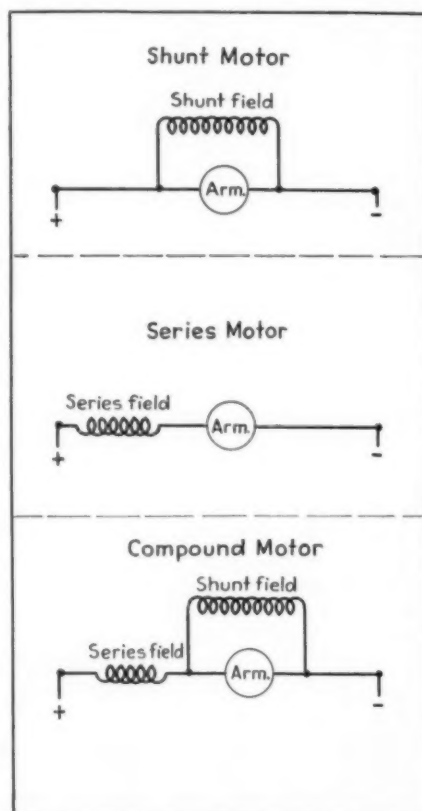
Selection of Motors

In selecting the type of motor for a particular job, information obtained on similar applications can be used as a basis. If it is possible to secure power-input readings on a machine of the same kind, doing the same job as the one to be motored, the guidance is clear. But whether the maintenance man solves his problem by going into a huddle with himself, or calls in a machinery manufacturer or a motor manufacturer, the following requirements need consideration to insure correct application—

1. Starting torque
2. Accelerating time
3. Speed requirements
4. Frequency of starting
5. Continuous or intermittent service
6. Variations in load
7. Special limitations imposed by the power supply
8. Type of drive—direct, belted
9. Position of motor with respect to driven load
10. Condition of surrounding atmosphere—temperature, dust explosive, gas
11. Noise

After the load requirements and characteristics have been determined, the motor characteristics and selection chart on page 77 will serve as a guide in selecting a d.c. motor.

In many cases, standard motors can be selected. Occasionally electrical and mechanical modifications are necessary to meet special service requirements. This may call for a flywheel mounted on the drive shaft, between the motor and the load, or close speed regulation or heavy overloads or extreme voltage fluctuations.



TYPICAL CONNECTIONS for shunt, series and compound-wound motors

Clark Controlled Manufactured Weather



TO SWING from the freezing of ice for Hockey and Ice Ballets, to the warmth needed for Boxing, Wrestling, Basket Ball and Bicycle Races calls for Manufactured Weather.

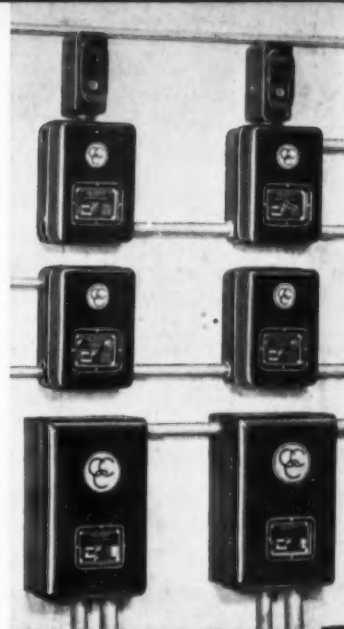
It's a fast swing, too, for various events follow rapidly on each other's heels in Cleveland's Arena.

Outside the actual arena, normal temperatures and good ventilation must be maintained in the restaurants, display aisles, and lobby.

At all these points Clark Controls function to aid presentation of the finest ice spectacles and sports events.

The six Clark Starters pictured at the right operate the exciter motors, agitator motors and brine pump motors of the Refrigeration System.

High up under the roof, other Clark Starters actuate and protect the motors of huge ventilating fans, while at various other places in the building Clark Size No. 1 Starters are used in connection with the heating system.



Your inquiries for controls in refrigeration, heating, ventilating, fire pumps, float switches, pressure and vacuum regulators, and alarm panels will receive prompt attention at our nearest office.



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CHICAGO • CHATTANOOGA • CINCINNATI • CLEVELAND
DALLAS • DENVER • DETROIT • LOS ANGELES • MINNEAPOLIS
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH
ST. LOUIS • SAN FRANCISCO • SEATTLE • TORONTO

Prest-O-Lite
Trade-Mark **TORCHES**
AND SOLDERING
IRONS...ideal for
electrical work



● **Prest-O-Lite** Torches and Soldering Irons are available in convenient and moderately priced outfits, covering every open-flame or enclosed-flame requirement of the electrical contractor. These appliances are economical equipment for soldering, heating and brazing.

Prest-O-Lite appliances operate on **Prest-O-Lite** Gas, which can be obtained conveniently in small tanks at any of the thousands of **Prest-O-Lite** Gas Exchange Service Stations. You exchange your empty tank for a full one and pay for the gas only.

Your jobber will gladly demonstrate the many features of **Prest-O-Lite** equipment. Call him, or write the Linde office near you.

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
New York and Principal Cities
In Canada:
Dominion Oxygen Company, Limited, Toronto

Noise Isolation In Air Conditioning

By Ernest B. Allen,

Consulting Engineer, Boston, Mass.

As told to Francis A. Westbrook

Recognition of few simple, general principles, either at the time of installation or later as a correctional measure, will do away with troublesome noise in air-conditioning systems. Satisfactory correctional jobs of very serious situations have been done in school buildings, where the noises made it necessary to shut down the air conditioning systems during school hours. Successful noise isolation has also been accomplished at time of installation in new buildings such as stores, broadcasting stations and auditoriums. Now with the widespread use of air conditioning in manufacturing, noise isolation is important in many branches of industry.

Proper isolation of the fan equipment for circulating air through the ducts is very important. Sound isolating attachments designed for all kinds of rotating equipment are now available from manufacturers who specialize in this field.

This article explains how noise isolation is accomplished by bolting an open wood frame upon a sheet cork base. The bolts or lagscrews which secure equipment to the wood frame are separate from those which secure the base to the concrete floor.

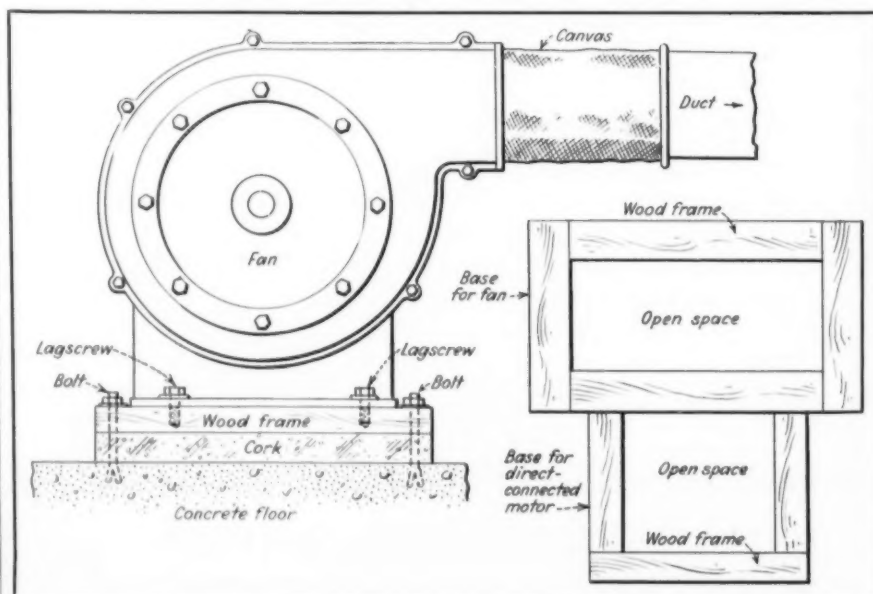
Where the motor is direct-connected to the fan the base is simply made large

enough to include it. The vibrations will not be telephoned between the two sets of bolts through the wooden frame. The discharge from the fan should then be connected to the duct work with canvas, strapped in place. This stops the machine vibrations going into the ducts.

The thickness of the cork used should be two to three inches, depending on the degrees of quietness desired and the weight of the machinery. The same thickness is used under both motor and fan. The wooden frame should be made of either 2-in. by 6-in. or 4-in. by 6-in. pieces, depending on the size of the fan and the motor.

The motor-driven circulating pump for the air washer should be similarly mounted on a wooden frame 2-in. thick with a 2-in. cork pad. Of course, the air washer unit may be so small that it does not need such treatment; but it should be inspected, as it may easily be a source of trouble. Fans should always be treated in this way, however, as they are in direct telephonic communication with the ducts.

Air cooling machinery such as a motor-driven compressor, might be so remote that it is not necessary to treat it in this way, but usually it is in the same room with the other air-condition-



ISOLATING NOISE—Fan equipment mounted on rectangular wood base. Sheets of cork between base and floor. Canvas connection between fan discharge and duct work.

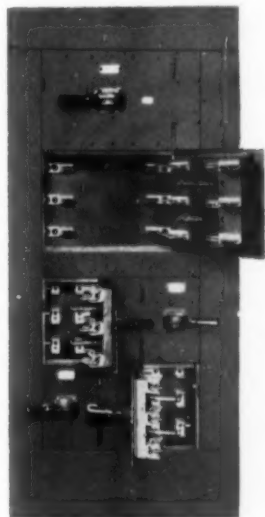
DESIGNED FOR



Saving Floor Space...



**... and here are
TWO GOOD EXAMPLES of
CLEVELAND SWITCHBOARD COMPACTNESS!**



***SAFETY
STURDINESS
SIMPLICITY**

• The above switchboard is typical of Cleveland Triple S* Switchboards designed for installation against the wall to save valuable floor space. They can be built to unlimited sizes or in smaller units as illustrated below.

Yes . . . Cleveland Switchboards are truly designed with the problems of the contractor and the customer in mind. Partitions that only interfere with ease of installation have been completely omitted and all parts are made removable without disturbing the balance of the board. And from the standpoint of your customer, this absence of partitioning guarantees freer air circulation and longer life . . . and the lack of crowding throughout allows for easier inspection and less troublesome maintenance.

Decide now to investigate Cleveland Switchboards, and you'll readily under-

stand why more and more contractors are turning to this Triple S* space saving equipment. Our new specification manual is yours for the asking.

Manufacturers of Safety Power and Lighting Panels, Knife Switches, Pull Boxes, Cutout Boxes, Cabinets and Switchboards.

**THE CLEVELAND
Switchboard
» » COMPANY « «**

2927 EAST 79TH STREET • CLEVELAND, OHIO

Established in 1900—Member N.E.M.A.

Branch Offices at Chicago, Detroit, Indianapolis, Buffalo, Dayton, Pittsburgh, Philadelphia, New Orleans, Baltimore, Birmingham.



Look!
a new
RIGID

**Guaranteed Stronger
and Safer than Ever!**

Here's a tool for you expert pipe wrench users who can't be fooled by shiny metal and ordinary guarantees — the new all-alloy **RIGID** with new design stronger housing and I-beam handle that adds still more strength to the famous unconditional guarantee.

It practically stops your pipe wrench repair bother and expense.

With its replaceable no-slip no-lock chrome molybdenum jaws and unbreakable housing, you've got a wrench you can depend on for any job, in any emergency. Add the pleasure of an adjusting nut that spins freely in all sizes, 6" to 60", a handy pipe scale on the full floating hook jaw, handle that's comfortable to your hand on a hard pull, and you see why **RIGID** is the wrench millions enjoy owning and using.

Buy from your jobber.

THE RIDGE TOOL CO.
Elyria, Ohio



A Work-Saving Tubing Cutter

This remarkable little **RIGID** tool smooths the tube for soldering as it cuts it. Integral reamer is handy and efficient. Ask your jobber to show you.

ing machinery. Experience has shown that as a general thing, the only way to make a really noiseless job is to also install this unit in the manner described above.

There are extreme cases, where the vibration of the compressor unit is so great as to be transmitted, through the iron pipes connected with the unit. In such instances, the only thing to do is to cut out a section of pipe and put in 18-in. lengths of heavy rubber hose similar to that used on automobile radiators. This has always been found very effective. However, it has never been necessary on the air washers.

Spring dampening devices may be used under the compressors with excellent results. They are more expensive than cork, but have the advantage of providing for adjustment of the spring tension to the peak point and the free forces in compressors make this adjustable feature very useful. Both the cork and spring dampeners have been used with complete success, but in extreme cases, the adjustable spring device is likely to be the better because of the adjustable feature.

The cost of isolation is not high. An averaging of a great many installations shows that the cost of the cork material for fans runs from \$7.50 to \$15, depending on their size. For compressors, it runs from \$10 to \$20 for cork, and for the spring dampener for bad cases from about \$40 for small units, to about \$75 for large ones. Cork sheets for the air washer circulating pumps will amount to from \$5 to \$10.

The labor cost of installing this isolation in new work is practically nothing extra. Of course, when correcting existing work, it usually means the raising of the machinery two or three inches and changing the pipe and duct connections. This naturally involves some expense, although nothing very great.

Portable Ammeter Checks Primary Current

Lights went out at a large automobile body plant, when a 667-kva. transformer burned out. At the time, the electrical maintenance department did not have available a spare transformer of sufficient capacity to use while the other transformer was being rewound. The largest one available was 300 kva. However, the engineer in charge of maintenance was able to install temporary service with this smaller unit until a transformer of sufficient capacity could be located.

One of the maintenance crew watched the load on the 300 kva. transformer by checking the primary current with a portable ammeter and high-voltage attachment. When the primary current



PORTABLE AMMETER measures current without breaking the circuit.

went above 15 amp., the foreman was instructed to turn out some of the lights in the plant and thereby reduced the load on the transformer. This procedure was followed until a spare transformer of proper capacity was located and installed.

The load on the primary of the transformer was measured by a Tong Test ammeter manufactured by the Columbia Electric Mfg. Co., Cleveland, Ohio.

Soldering Wires in Telephones

One of the sources of trouble in telephone instruments may be traced to improper soldering of wires connected to switchhooks, transmitters, receivers, and other parts of such instruments. There is a tendency to overlook the action which some soldering fluxes have upon both the insulated wires and contact springs.

Soldering fluxes are primarily applied to metals to allow solder to flow readily upon their surface. They also cleanse the exposed surface of the metals and prevent the formation of oxides during the process of soldering. Unfortunately, many of the fluxes unavoidably flow between the insulation where they act as a conductor, thus tending to break down the insulation. This causes trouble which cannot readily be detected.

Rosin-core solder is, therefore, suggested for this purpose, for it has all the properties which will insure against operation failure. This solder should be applied to the necessary points by means of a soldering iron. Care should be taken to avoid burning the insulation which separates wires and contact springs, as this may also cause instrument trouble due to a break-down of the insulation.

**NAME OF MANUFACTURER
500 WATTS**

**COMPLIANCE WITH
SPECIFICATIONS UNDER
APPROVED INSPECTION
PROCEDURE OF RLM STANDARDS
INSTITUTE CERTIFIED BY
ELECTRICAL TESTING
LABORATORIES**

**ATTENTION
ELECTRICAL CONTRACTORS**

Another of the series of advertisements sponsored by the RLM Standards Institute and directed to the individual users of lighting equipment is reproduced here to keep you informed on the work being done in your behalf.

RLM REFLECTORS
provide the
BALANCED LIGHTING
required for proper
LIGHT CONDITIONING

LIGHT CONDITIONING for the improvement of employee efficiency, product quality and industrial relations, consists of more than simply providing enough light to meet present-day illumination standards. Of equal importance, light also must be evenly distributed and adequately diffused. For it is only when quantity, distribution and diffusion of light are in correct balance that proper seeing conditions are obtained.

Every reflector bearing the RLM Label is built to conform to the high RLM Standards for proper light distribution and diffusion. To meet these standards, RLM reflectors employ a porcelain enamel reflecting surface, the most widely accepted reflection material for proper diffusion and distribution of light. The unusually high RLM Reflection Factor Standards for Porcelain Enamel give further assurance of high lighting efficiency. Nine manufacturers now make RLM DOME, RLM DEEP BOWL and RLM SYMMET-

RICAL ANGLE Light Reflectors which meet the RLM specifications for Balanced Lighting and the other three essentials to proper light conditioning which are:

- 1 **MORE LIGHT AT NO EXTRA COST**—High reflection factor and output specifications increase the total light of the lamp directed to the working plane.
- 2 **LOW COST MAINTENANCE**—RLM specification high quality Porcelain Enamel is the most durable of all reflecting surfaces. No extremes of temperature—no atmospheric conditions can affect its original finish. It can not become porous. It resists dirt and is easier to clean. Maintenance costs, therefore, are reduced to a minimum.
- 3 **WARRANTY OF UNIFORM QUALITY**—A rigid inspection and testing service conducted by the Electrical Testing Laboratories of New York, an independent testing organization, insures continuous conformance to RLM standards by manufacturers of RLM labeled reflectors.

**FREE BOOKLET
NOW READY FOR YOU**

Invaluable to everyone who specifies, purchases or sells industrial lighting reflectors. Tells the purposes of the RLM Label and details the RLM standards which assure maximum lighting performance. Write to the address below for your copy.

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE
INCORPORATED

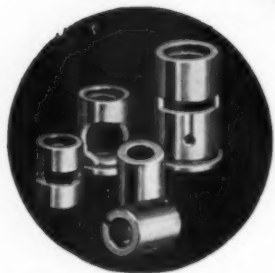
20 N. WACKER DRIVE • SUITE 1130 • CHICAGO, ILL.

THE CERTIFICATE OF



UNIFORM QUALITY

**I'LL BET
BUNTING
LISTS IT AS A
STOCK ITEM**



FIRST thing to do when you need a motor bearing is to look in Bunting's catalog, which lists bearings for service replacement in all makes of electric motors from 1/40 hp to 60 hp. These bearings are completely machined and finished exactly to

shaft size with all oil grooves and holes, ready for immediate assembly. Any quantity is available instantly from stock at any time. Write for catalog.

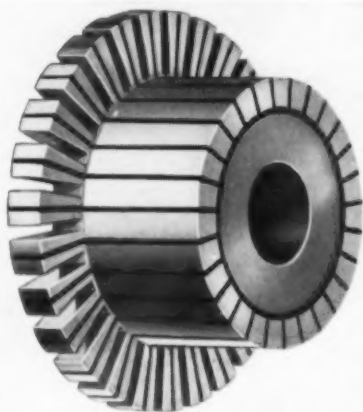
THE BUNTING BRASS & BRONZE COMPANY

BUNTING  **Quality**
BRONZE BUSHINGS • BEARINGS
MACHINED AND CENTERED BRONZE BARS
BABBITT METALS

TOLEDO, OHIO

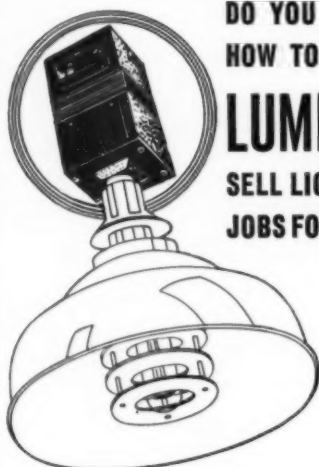
Branches and Ware-
houses in All Prin-
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DROP YOUR COMMUTATOR PROBLEMS IN HOMER'S LAP



Whether a long run of stock commutators for an appliance, or a single commutator for an immense roll mill motor, HOMER gives service that satisfies. Leading manufacturers of motor-driven appliances and motor and generator builders all turn to Homer for commutators built to their specifications and to meet short delivery dates. Special attention is given to "hurry-up" repair jobs. MATERIALS used are highest quality, accurately gaged, and thoroughly inspected, so that smooth running at all speeds is assured. You too can depend on Homer to take care of your commutator problems.

HOMER COMMUTATOR CORP.
4748 Hough Avenue, Cleveland, Ohio



**DO YOU KNOW
HOW TO MAKE
LUMENS
SELL LIGHTING
JOBS FOR YOU?**

In these times, no business can afford to ignore the actual cash savings that may result from a modernized factory lighting system. Suggest a "light output" (lumens) investigation. Then prove with facts the lighting improvements and savings that can result thru modernized lighting with Acme high intensity Mercury Vapor transformers. Write today for details about Acme High Intensity Mercury Vapor transformers.

THE ACME ELECTRIC & MFG. CO.
36 Water Street Cuba, New York

Acme Electric
TRANSFORMERS

Arc Welding In the Arctic

Electric arc welding prevented the ruinous loss of a season's work at a mine at far-off Kotzebue Sound, Alaska. A "bull wheel," broke the large gear-wheel which swings the boom and cab of a dragline shovel. Since mining can be carried on for only 100 days a year, a speedy repair job was vital.

There was only one chance to save the season's work. Across the Sound, the Arctic Circle Exploration, Inc., had a well-equipped mining outfit at work at a little settlement called Candle, a five-day trip away. Included in the equipment at Candle was a General Electric gasoline-driven arc-welding set. There within three hours of arrival, the pieces of the broken bull-wheel were assembled and welded into place. The total interruption lasted only two weeks.

The files of Arctic Circle Exploration Inc., are filled with many stories



MOVED TO THE JOB—Gasoline-driven arc welding set is mounted on skids and dragged to where it is needed.

of loss avoided by means of arc welding. A stripped pinion on a dredge threatened to be the cause of a serious loss of time. An airplane was summoned by radio and a messenger dispatched to Nome to search through mining stores and scrap piles for a substitute gear. But before he returned, unsuccessful, the old gear had a new set of teeth built up from welding rod and had been returned to service with the loss of only one day.

Miles of pipe line stretch across the tundra, pipe from 15- to 30-in. in diameter. When Y's, or L's or T's, or bends are needed, they are fabricated on the job, made up from bits of pipe welded together in the desired form.

Thousands of 3/4-in. thawing pipes are in use, each length of pipe having a special steel point welded to it. When points must be replaced, because of breakage and wear, the job is quickly done by welding.

Worn machinery parts are built up with welded metal, as are parts reclaimed from the scrap heap. Innum-

able odd jobs, each important though small, are executed successfully through the short, intensive working season Dredges, tractors, draglines, and scrapers must be kept at work every hour possible. The gold to pay the costs must be wrested from the frozen gravels of the valley so delays can not be countenanced.

The gasoline-driven arc welding set at Candle is always on the job, ready to serve. It is not permanently installed in the shop, but instead is mounted on skids so that it can be dragged across country by tractor to the place where its service is required.

Maintenance of Graphic Meters

By W. H. Bollinger

The Esterline-Angus Co., Indianapolis, Ind.

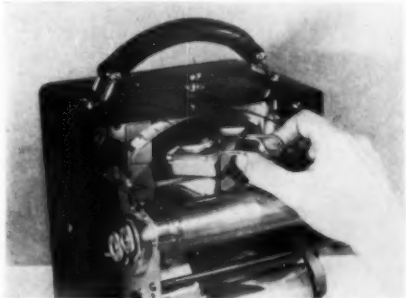
Complete information on the care and operation of graphic recording instrument is found in the manufacturer's instruction book. But where the data is not at hand the following rules will help:

1. Handle graphic instruments with care. They should not be subjected to rough handling.

2. See that they are protected from excessive moisture, dust, corrosive fumes, severe vibration, or extremes in temperature. The performance of a spring clock chart driving mechanism is greatly improved if it is kept clean.

3. Be careful when filling the ink well. Spilled ink that gets on the coils of electrical instruments causes a rapid deterioration of insulation on the wires. As a result, turns become shorted, and the meter begins reading "low." Always empty the inkwell before moving a portable instrument.

4. Occasional washing of the inkwell and pen with warm water or alcohol will do much to avoid inking difficulties. If the meter is used where the temperature is below freezing, dilute the ink with alcohol.

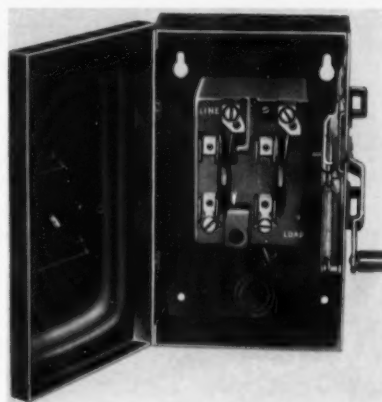


REMOVABLE INKWELLS are furnished with some graphic instruments. This is a great advantage when it is desired to clean out the inkwell.

WARD LEONARD MOTOR DISCONNECT SWITCHES

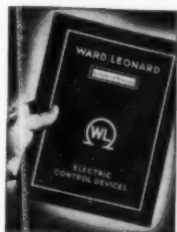
ARE

- ✓ Easy to install
- ✓ Stand overload
- ✓ Pass inspection



The electrical contractor has many things to consider when selecting control equipment. When he leaves the job it must be final . . . no comeback to make repairs or adjustment . . . no payments held up by inspection. Ward Leonard knows his problems and has designed its entire line of Industrial Controls to make his work easier and more profitable.

The entire Ward Leonard Line of Control Devices is described in full in the bound catalog "Industrial Control." Request a copy. It will make your job easier.



**WARD LEONARD
ELECTRIC COMPANY**
28 South Street, Mount Vernon, N. Y.
Electric Control Devices Since 1892

DIAMOND INSULATION

DIAMOND INSULATION is an exceedingly tough thin insulation developed primarily for use as an insulation for armature slots and field coils.

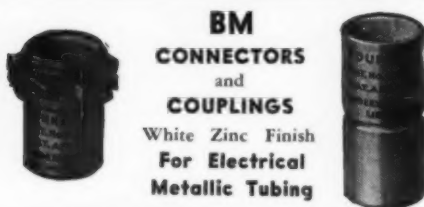
DIAMOND INSULATION will stand extreme bending without cracking. In addition to toughness, it possesses a hard surface which resists the abrasive action of rough spots in the machined slot. These properties make it an ideal material for armature and field coil insulation.

DIAMOND INSULATION is made in sheets and continuous rolls, or it may be had in ribbon rolls for automatic machines. It is furnished in a natural dark gray color only, no pigments or other coloring matter being used in its manufacture.

Continuous rolls and ribbon rolls are supplied in thicknesses from .004" to 1/32". Sheets approximately 48" x 80" are supplied up to and including 1/8".

**CONTINENTAL-DIAMOND
FIBRE COMPANY**
NEWARK, DELAWARE





BM
CONNECTORS
and
COUPLINGS
White Zinc Finish
For Electrical
Metallic Tubing

HERE IS THAT REALLY SIMPLE METHOD

● So simple, in fact, that two squeezes on the handles of the B-M Indenter and the B-M Connector or Coupling is securely fastened to the Electrical Metallic Tubing. No lost time—no complicated installation troubles.

● The simplicity of installation of the B-M Connectors and Couplings is the reason for their popularity with contractors everywhere. Inasmuch as our tools and method of fastening the fittings to the tubing are patented, we limit the license of our tools under these patents to the installation of our fittings only.

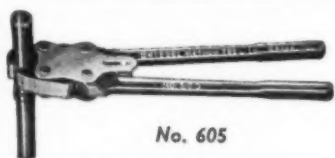
● Listed by Underwriters.

For further details,
see your wholesaler



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B-M INDENTER
FOR INSTALLING $\frac{1}{2}$ " FITTINGS

THE BRIEGEL METHOD TOOL CO.
Not Incorporated
GALVA, ILLINOIS

5. Use ink supplied by the manufacturer of the instrument. This ink is usually best suited for that particular inking system.

6. Keep the charts dry, because they expand when damp. If strip charts are damp, difficulty may be expected in feeding through the meter.

7. Be careful to thread the chart through the meter properly.



SHIPPING CASE is a good investment for graphic recorders frequently shipped by truck or rail. Note pad surrounding the meter, and drawer for accessories and supplies.

8. Select a chart speed that will sufficiently spread out the record. A chart speed that is too slow will often produce a sloppy record that is difficult to interpret.

9. Do not use shunt leads on a d.c. ammeter or wattmeter other than those supplied for that specific instrument. Substituting other leads invariably will cause an appreciable error in the meter reading. For all other instrument wiring No. 14 or larger wire is recommended.

10. Be particularly careful regarding connecting a wattmeter. The many current and potential circuits make possible a wide variety of connection schemes, only one of which is usually correct. Consult the wiring diagram in the instruction book each time.

11. If an instrument is in need of repair, send it to the manufacturer or to a repair company they recommend as being adequately equipped to service their instruments.

Let There be Light!

Reflector and lamp bulbs should be cleaned periodically. When dust and dirt is allowed to accumulate on them the light output may be decreased by as much as 15 to 25 per cent.

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H Headquarters
One Source of
Supply for Wire
and Insulating
Materials
Quality - Dependability - Service

● Take advantage of this specialized service for wire and insulating materials—get the highest quality—any amounts and quickly. This one source of supply makes the purchase of wire and insulating materials easy and convenient for you whenever you must order.

One of the quality products we sell

P-300 Motor Lead Wire

For small motor usage where a baking varnish is used. Tinned Copper, Paper Separator, Special Rubber Compound to resist Baking Fatigue—Single Braid Cotton, Heat Resisting Lacquer Finish. Furnished on spools. Sizes 18 and 16 furnished in black, green, red, and yellow. Other sizes black only.

● Insulating Varnishes for every need—see our catalog featuring PEDIGREE brands.

● New, free catalog makes ordering easy. It features the approved products we handle—by using this catalog it is a simple matter to take care of any requirement and obtain parts made by reputable manufacturers.

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INCORPORATED**
2127 Pine St., St. Louis, Mo.

* The HARTMAN Line *

GROUND CLAMP—
Is threadless. Receives conduit at any angle. Rigid or thin wall conduit U bolts from $1\frac{1}{4}$ " to 6".



WEATHER PROOF SOCKET
—Is easy to install and is neat in appearance. It will hold heavy reflectors at any angle. Built of aluminum alloy, brightly finished.

for details write

B. HARTMAN

708 W. Esther St.
Box 708 W. State St.

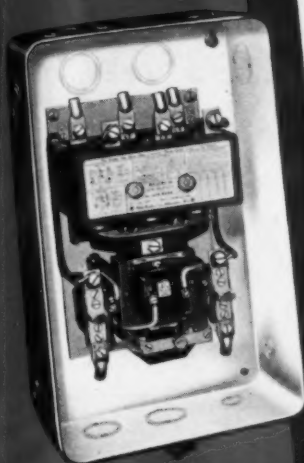
Long Beach, Calif.

Use your copy of

**The
ELECTRICAL BUYERS
REFERENCE**

ELECTRICAL CONTRACTING EDITION

**It will save you
time and money!**



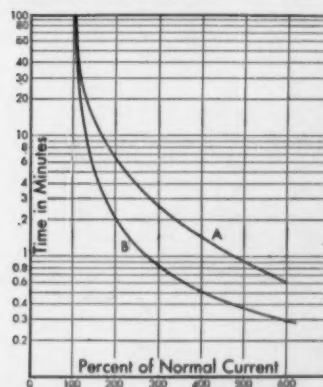
Bulletin 709 solenoid starter
with cabinet cover removed.



"Wait! He only wants to see the relay go off"

And it will go off—just as soon as it reaches the temperature that indicates "motor overheating." These eutectic solder thermal relays on Allen-Bradley solenoid starters provide positive motor protection against sustained overloads. But that's only one of the Allen-Bradley solenoid starter's advantages. It has double break, silver alloy contacts that never need filing. Consequently, no time is wasted on contact maintenance. Also, contact life is greatly increased. The solenoid switch mechanism is unusually rugged. It has no bearings to stick and no jumpers to break. That's why these starters can guarantee you such long, trouble-free service.

Full Overload Protection for Your Motors



(A) Average motor heating curve.
(B) Tripping curve of eutectic solder
overload relays on A-B solenoid
starters. The motor is always protected.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

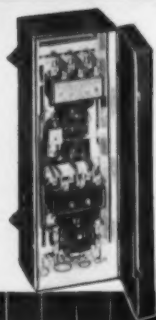


How to Start Any Squirrel-Cage Motor

Without

CAUSING LAMP FLICKER or SHOCK to CONNECTED MACHINERY

If you have a condition requiring smooth motor acceleration, these automatic Allen-Bradley starters will exactly meet your needs.

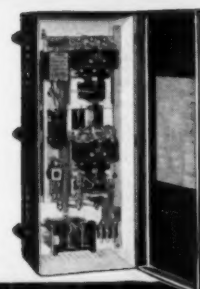
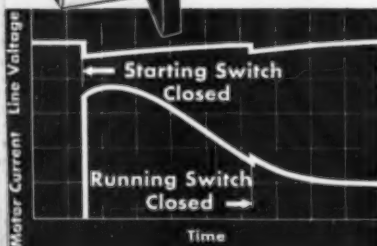


Bulletin 740

Two-Step Compression Resistance Starters

Recommended where conditions do not permit across-the-line starting. Simple and inexpensive. Ideal for the average motor applications. Provide smooth acceleration.

Left: Line voltage and motor current curves using the Bulletin 740. The compression type resistors are steplessly adjustable.

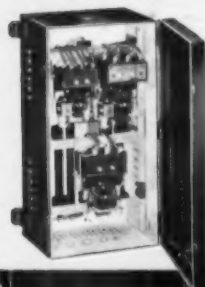
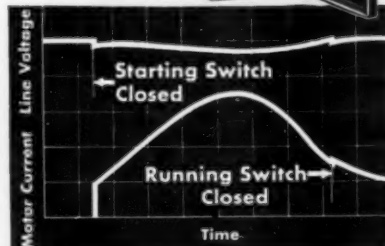


Bulletin 742

Velvet-Smooth Stepless Resistance Starters

For network systems where no lamp flicker is permissible. The velvet-smooth acceleration provided by this starter cannot be matched by any other starter on the market.

Right: Motor current and line voltage with the Bulletin 742. Note the smooth current rise. There are no dips in voltage.

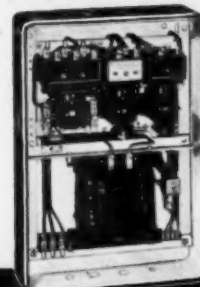
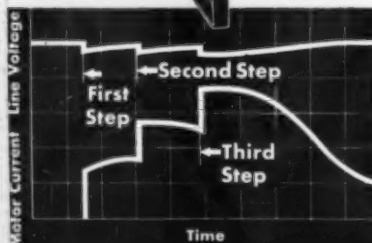


Bulletin 741

Three-Step Compression Resistance Starters

For starting squirrel-cage motors on network systems. Where power company regulations make a three-step starter necessary, this Bulletin 741 is the proper starter to use.

Left: Line voltage and motor current curves with the Bulletin 741 starter. Note that the motor is accelerated in three steps.

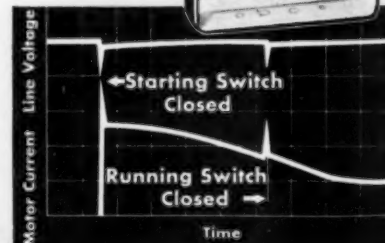


Bulletin 746

Transformer Type Starters

Used where the power supply is limited, where lamp flicker is not objectionable, or where loads need a shock for starting. An auto-transformer is used to reduce the voltage.

Right: Motor current and line voltage curves with the Bulletin 746. Starting currents are low but there are line disturbances.



SEND FOR THESE

REDUCED-VOLTAGE
STARTER
BULLETINS

Allen-Bradley Co.
1307 S. First St.
Milwaukee

Please send your reduced-voltage starter bulletins.
Name
Company
Address

Allen-Bradley offers the most complete line of automatic reduced-voltage starters on the market, in ratings from 5 to 600 horsepower. If you have a motor starting problem, consult Allen-Bradley engineers.

ALLEN-BRADLEY

AUTOMATIC SOLENOID TYPE REDUCED-VOLTAGE STARTERS

Motor Shops

TAGGED FOR SAFETY

Every piece of repaired apparatus is sent back by the Electrical Motor Repair Company of Trenton, N. J., bearing

NOTICE PLEASE READ THIS FOR YOUR PROTECTION

This equipment has been rewound or repaired by us. We guarantee all workmanship and material used on same, and if any defects develop we should be notified immediately.

Before connecting this apparatus to current be sure to determine what damaged some before it was repaired. There are many reasons for this and they all should be checked.

We would suggest that you call us and we shall be pleased to make a test at a nominal charge.

This test might save you many shut-downs in the future.

**ELECTRICAL MOTOR REPAIR
COMPANY**

Chambers and Tingo Streets
Phone 2-6333 Trenton, N. J.

CUSTOMER REMINDER—Red tags on repaired apparatus suggest a general checkup before putting into service.

ing a red warning tag. These tags warn the customer to check up on associated apparatus for possible mechanical defects before putting a repaired motor or other apparatus back in service.

ACID-PROOFING FOR ARMATURES

Some chemical plants pay out large sums each year to recondition motor winding insulation damaged by corrosive liquids, fumes and particles. One large motor repair firm in Richmond, Va., has had considerable experience with correcting this condition, particularly where d.c. motors are used. Here, breakdowns in armatures were found to originate underneath or near the commutator V-rings. It presented a difficult repair problem.

When chemical plant equipment is brought into this shop, it is first cleaned of all surface accumulation of foreign matter, then baked to remove any moisture or oil soaked conditions. Tests are then made to locate defective insulation. After repairing such weak spots the windings are again preheated and dipped.

This company uses a high grade varnish that is specially prepared for use in damp corrosive chemical surroundings. Usually three dips and bakes are given the repaired equipment. This is important with armatures, where it is necessary to get thorough impregnation underneath the commutator and around the connections.

REVOLVING PEDESTAL WORK BENCH

Turn the work rather than take countless steps around it, is the principle of this revolving pedestal work bench. It was designed and built by R. O. Johnson, manager of the Skeen Electric Works, Portland, Ore. It con-



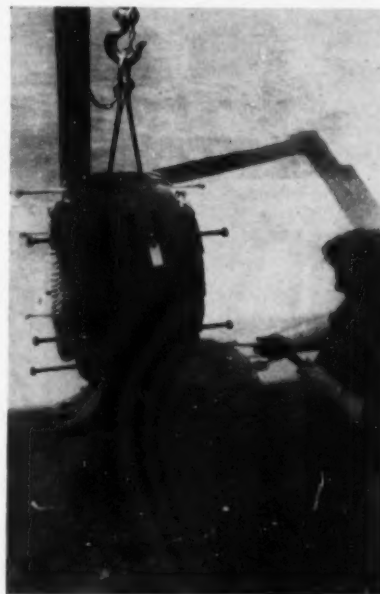
STEP SAVER—Bench holds stator and turns so workman need not move.

sists of a hollow metal pedestal flared at the base. Turning inside this is a wooden spindle shaped down at one end to just fit the opening. The shoulder left on the spindle rests on the top edge of the pedestal to form the bearing. It can be readily turned with a load on, but not too easily, so that the work remains quite steady.

On top of the wooden spindle is a platform made of two-inch plank, with metal side pieces on two edges to keep the work from slipping off. The platform is reinforced underneath with metal strips to make it more rigid and is firmly fastened to the top of the spindle. A 10 hp. stator is shown on the bench.

GROOMING THE RENTED MOTOR

Customers want quick replacements when important motors break down. But they rarely appreciate the overhead incurred on the part of the motor



RENEWED INSULATION—Loaned motors receive careful cleaning, baking and new varnish after severe usage.

service shop that supplies a temporary unit.

Here is a 100 hp., 550-v., 900 r.p.m. motor being cleaned of gritty accumulations, after its return to the Thomson Electrical Works, Ltd. of Montreal. This motor had been in temporary service at the British Rubber Company plant.

The motor had to be dis-assembled and blown out under air pressure. When thoroughly clean the stator was pre-heated to remove any accumulated moisture from the windings, then dipped in insulating varnish and given thorough baking. The Thomson Works has manufactured motors for almost fifty



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ELECTRICAL
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Tune in on C.B.S. Wednesday evenings for the U. S. Royal
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Life

**IS ONLY AS GOOD AS ITS
INSULATION**



United States Rubber Company

United States Rubber Products, Inc., New York, N. Y.

WIRES and CABLES

**LINEMEN'S BLANKETS • SPLICING COMPOUND
TAPE • SWITCHBOARD MATTING**



In thousands of show windows Sterling Lite-Flo reflectors have doubled light intensities at the merchandise trim using the same lamps.



In store after store Ster-Lite Fixtures have multiplied light intensities at selling levels — on merchandise, tables and show cases — with surprisingly low wattage.

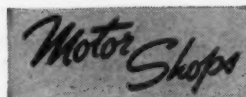
The PLUS LIGHTING VALUE afforded by these remarkably efficient units has swung many profitable wiring jobs to alert contractors. Write for literature and prices.



REFLECTOR & ILLUMINATING CO.

1435 West Hubbard St.

Chicago, U. S. A.



[FROM PAGE 89]

years, therefore, its emergency stock of motors is kept as nearly on a par with new equipment as is possible.

EQUIPPED FOR HEAVY TRANSFORMERS

Several power companies send their transformers to the Central Armature Works, Inc., of Washington, D. C., for repair. Since they vary widely in height and weight, arrangements were made to handle transformers in a separate department on the second floor, to avoid interference with other shop production.

The second floor location worked out well for lifting the cores from tall transformers. An overhead trolley beam was extended outside the build-



TRANSFORMER SERVICE—Practical handling arrangement for hoisting the big ones from the driveway, one story below.

ing over a driveway, and a door was provided in the steel framed window appearing in the background. With this arrangement it is easy to lift out cores before they are unloaded from the truck, after which the cases are also hoisted to the second floor and routed to the cleaning room.

A 4-ton chain hoist is used on the outside boom, while a 1-ton electric hoist is provided for the shop monorail. The three 250 kva. 13,200-110/220 volt transformers in the background were ready to be returned to service.

VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO

WIRE • BARE WIRE • MAGNET WIRE • SERVICE ENTRANCE CABLE • CRESFLEX NON-METALLIC SHEATHED CABLE

WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE



The Department of Interior Building
Washington, D. C.

CONVINCING PROOF



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U. S. Naval
Academy
Annapolis, Md.
Rewired for
heavier load

of

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The Archives of
the United States
Washington,
D. C.

ability to produce the highest grade INSULATED WIRE and CABLE

CRESCENT Wire & Cable installed in this group of buildings is insulated with CRESCENT ENDURITE Rubber Compound, a superaging insulation which, due to its superior heat resisting and high dielectric characteristics, far exceeds Federal Specifi-

cations JC-106. If your job requires conductors that must meet abnormal temperature and aging conditions, get complete information on CRESCENT ENDURITE from your nearest CRESCENT representative.



Jobber Co-Operation—A Permanent Policy

CRESCENT ENDURITE SUPER-AGEING INSULATION • WEATHER PROOF WIRE

Better Lighting

Selling Light to the Auto Salesroom

Layout, Equipment and Intensities To Use

Among the average contractor's customers, the automobile sales and service establishment is a prime prospect for modern lighting. Cars today are sold largely on the basis of appearance. For design, color, trim and finish are primarily appeals to the eye. So these people need good light.

The automobile dealer has one fundamental objective, to sell cars. And in order to carry out this objective with modern automobiles, he must present them to the customer under conditions which bring out their visual appeal to the best advantage. This means good light—and more light.

The contractor may feel that all the auto sales and service establishments are well lighted. However, he will usually find that some departments are considerably below modern standards. The correct intensities are shown on the accompanying diagram, representing a typical job. But in practice of course, the entire modern lighting system need not be sold at one time.

The approach will be to visit the local showrooms and note just where re-lighting is most needed. It may be the salesroom or the shop. Stockrooms are usually far below modern standards. By re-lighting the areas where the standards are lowest you will be making a start and the rest of the job can be sold on the basis of the improvement in this department.

Sales Floor. For modern lighting there are a few basic rules that apply specifically to the auto salesroom—

1. General lighting should provide a high level of shadowless illumination evenly diffused over both horizontal and vertical surfaces.

2. Luminaires should not attract the eye away from the display.

3. Annoying high brightness reflection from polished surfaces should be avoided.

Under average conditions a fixture of the totally indirect type best meets the condition. Types which include means of illuminating the exterior surface help further to reduce contrast between the bright ceiling and the fixture bowl. Low ceilings require a large number of units to provide even lighting. High ceilings permit fewer units with proportionally larger lamps but the lighting intensity in either case should not be less than 20 ft. candles.

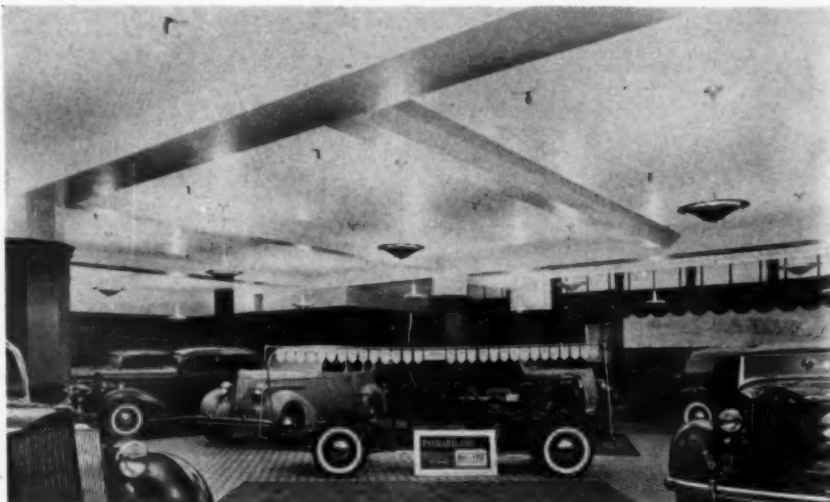
Offices require equally careful treatment. In most salesrooms they are visible from the sales floor. Under these conditions they should not sharply contrast with the sales area either in type of lighting or intensity.

Window lighting will vary with the type of establishment. Auto salesrooms

are usually visible from the street through large windows, making a show window of the entire salesroom. For night lighting a row of high intensity adjustable flood lights, with suitable louvers above and below the windows, will effectively high-light models near the windows. The louvers are particularly important when the window lighting is used during regular business hours.

Accessory Display areas need a further touch of "flash." The polished chrome of gadgets should glint and sparkle an appeal to the customer. Spotlights at the ceiling above directed down on the display will give this effect. Open louvers or prismatic glass units installed with the ceiling may be used, or indirect—direct luminaires with a louvered direct lighting source in the bottom of the fixture.

The Service Department requires an



LIGHT SELLS CARS—This lighting installation in a Packard showroom in Chicago demonstrates the value of modern lighting in the auto salesroom.

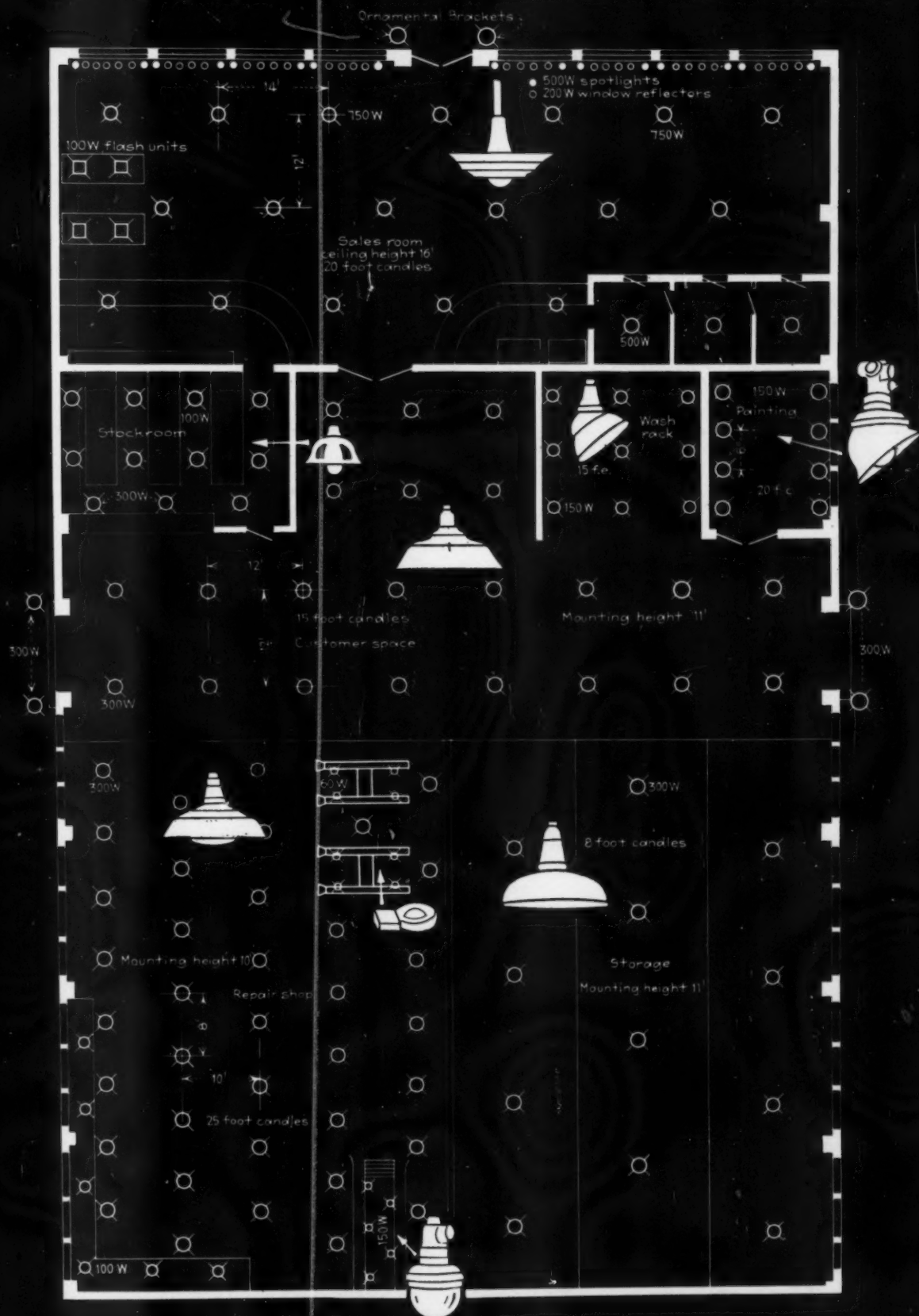
TO HELP YOU SELL

Second in a series of practical suggestions to make it easy for the contractor to sell more better-light jobs. This guiding data points out what specific industrial and commercial customers need and how to give it to them.

In January we covered the print shop. Similar articles will follow in coming issues showing how to light other types of buildings. These recommendations will open the door to much new business and make it easy to lay out the job when it is sold.

GOOD LIGHTING FOR THE AUTO SALES AND SERVICE ESTABLISHMENT

Recommended layout showing the location of outlets,
type of lighting equipment and intensities of illumination required in the various departments.



QUALITY means ECONOMY

- EASIER BENDING
- EASIER CUTTING
- EASIER THREADING
- EASIER WIRE PULLING

"ELECTRICTUBE"

Electrical Metallic Tubing is coated on the outside with a substantial amount of zinc evenly deposited by electro-plating process to stand severe corrosive conditions. Interior surface is coated with an enamel especially developed by us, which is impervious to acid and insures a perfect raceway for pulling wires. Can be used with any standard light wall fittings.

"GALVAKOTE"

Exterior surface and threads coated with zinc evenly deposited by electro-plating process in quantity to withstand more than four dips of Proco test in regulation copper sulphate solution. Interior furnished coated with the best quality black enamel.

"ENAMELKOTE"

Coated inside and outside with high-grade black enamel, properly baked in modern ovens to insure adhesion to pipe wall, and sufficient flexibility to prevent flaking in bending.

"HOTKOTE"

Exterior and interior surfaces evenly coated by the hot galvanize process and then covered inside and outside with a coat of transparent enamel.

"HOTKOTE" NIPPLES

These rigid conduit nipples are also approved by the Underwriters' Laboratories and so labeled. All threads are protected with a special coating that is rust resisting.

Underwriters' Laboratories tested and approved.

Distributed everywhere by leading wholesalers.

CLAYTON MARK & COMPANY

20 N. Wacker Drive, Chicago U. S. A.

MANUFACTURERS FOR MORE THAN A THIRD OF A CENTURY.

Better Lighting

[FROM PAGE 94]

entirely different treatment. Again basic rules can be set down—

1. The entire shop should present the appearance of brightness and efficiency to the customer.

2. Lighting should be laid out to suit the use of each area.

3. The repairs and inspection areas should be equipped with diffusing luminaries positioned to illuminate both horizontal and vertical surfaces.

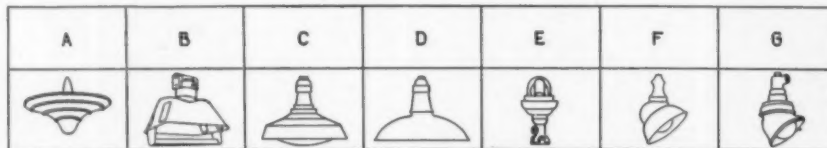
The first of these rules is of real importance today. With the growth of competition from chain service organizations, the dealer is prepared to recognize the function of light in building customer confidence in his service facilities. For this reason the drive-in and inspection areas should be brightly

WHAT TO INSTALL RECOMMENDED INTENSITIES AND UNITS FOR VARIOUS DEPARTMENTS OF AN AUTOMOBILE SALES AND SERVICE ESTABLISHMENT.

Area	Foot candles	Type of unit	
Showroom	20	Indirect	A
Stock Room	20	Special	B
Customer Space	15	Glassteel	C
Repair Shop	20	Glassteel	C
Storage	8	RLM dome	D
Pit	15	Explosion Proof	E
Wash Rack	20	Vapor Proof	F
Paint Shop	15	Explosion Proof	G

type units mounted in niches in the pit walls or directly on the wall, will provide good under-chassis illumination. Five 150 watt units are generally adequate for the average pit.

Stock rooms usually serve the customer as well as the shop employees and should present a bright, well-lighted appearance. The lighting should be de-



Pictorial index to types of units in the above table.

illuminated with attractive efficient luminaries. The glass steel diffuser fits in here. The same type of unit is ideal for the repair shop. It is a good point to keep in mind that much work on the car is done from below and for this reason enclosing glass or some other means of preventing direct view of the bare lamp is essential in the shop.

Spray Painting Shops require class 1-D hazardous area fixtures. If the shop is just wide enough for one car, rows of angle reflectors at each side will give good light distribution. Wash rack layouts should be similar but with lighting units of vapor proof type.

Fixtures specially designed for mounting on the track of garage lifts are now available. These units direct the light up under the chassis and avoid the use of extension cords. Four to six of these units on each lift will usually be adequate. Repair pits require explosion proof units designed for class 1-D hazardous areas. Bracket

signed to provide even distribution vertically over the shelves. Stock room fixtures are available which mount level with the top of the shelving and direct the light to both sides.

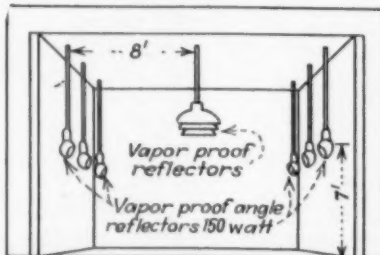
The layout shows a typical salesroom and service shop with lighting designed to meet these modern standards. The foot candle values shown are the minimum recommended for modern lighting practice. In many cases higher values than those shown will be desirable. The types of fixtures indicated may be varied to the particular condition in the establishment.

The spacing and arrangement of units in actual practice may differ widely from those shown due to variations in the construction features of the building. However, the area per unit should be kept approximately the same to give the same illumination value.

MEMORIAL WINDOW LIGHTING

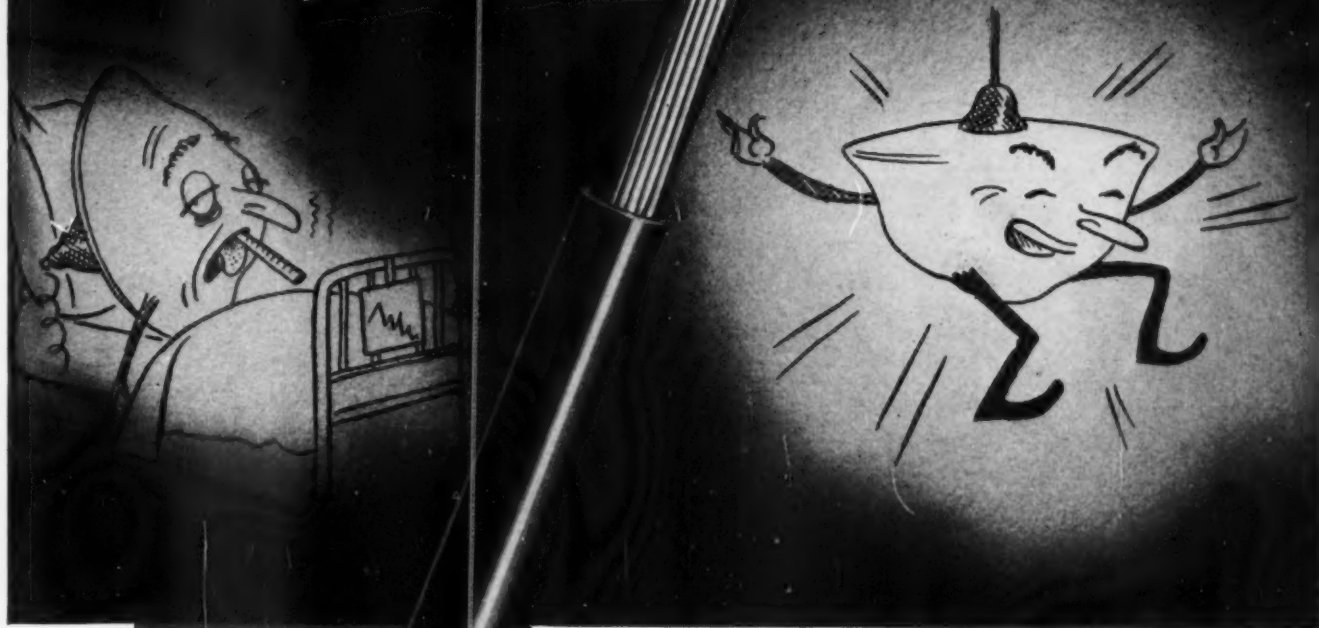
A unique method of lighting church windows was developed for a group of memorial windows in a Milwaukee church. A row of sixty-watt lamps, in 90 degree angle sockets, was run along both sides of the window, installed between the outer storm sash and the stained glass. The lamps are mounted seven inches away from the glass on twelve inch centers.

Half silvered lamps were used, with



WASH RACK—How to arrange the lighting units to speed car washing.

HERE'S A CURE FOR "FIXTURE FEVER"*



IT HELPS CONTRACTORS MAKE MORE MONEY, TOO!

You can't do much about high temperatures in modern fixtures. Demands for increased light brought the introduction of high-intensity lamps—and plenty of heat.

But—you can use fixture wire that isn't damaged by severe treatment. You can install Deltabeston Fixture Wire and bask in the contentment of satisfied customers.

Deltabeston Fixture Wire is insulated with Purified Asbestos. Excessive heat doesn't cause it to fail—doesn't ruin the efficiency of lighting equipment.

Insulation, felted to the conductor, helps you too. It makes the wire more flexible. Installations are easier—faster—more profitable.

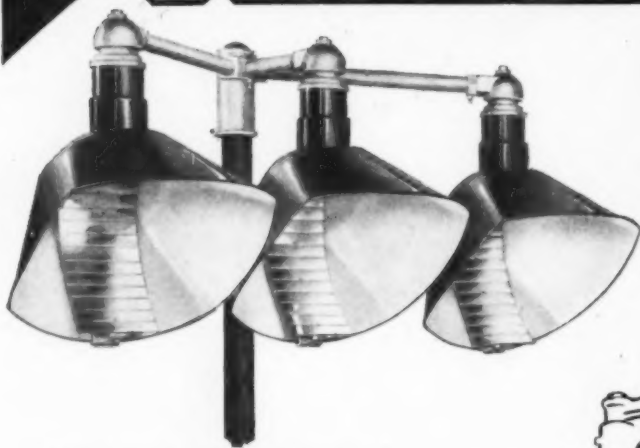
Find out all about Deltabeston Fixture Wire before your next lighting job. Address Section Y-8173, Appliance and Merchandise Department. General Electric Company, Bridgeport, Connecticut. A complete line of Deltabeston Wires and Cables are distributed by General Electric Merchandise Distributors and Graybar Electric Company.

*FIXTURE FEVER

An ailment that may attack any type of fixture. Characterized by inefficient illumination — frequent service calls. Occurs when fixture wire is not insulated to resist severe heat.

GENERAL ELECTRIC

Improved QUAD FLOODLIGHTS



MULTIPLE INDIVIDUAL LIGHT CONTROL MOUNTING

• When three Floodlights bloom where one grew before—it's bound to be Quad Multiple Mounting. Nobody else has it!

Quad gives you cast aluminum brackets of special design that eliminates the usual litter of pipe fittings, tees, elbows, nipples and what not.

Quad saves you time and money! In Quad Multiple Floodlights each reflector unit may be turned or tilted to direct the powerful beam to the exact spot where light is needed.

A CHOICE OF THREE TYPES OF LIGHT DISTRIBUTION

Quad floodlights give you installation economy and flexibility.

For any outdoor lighting project, whether in the field of sports or business, you can select a Quad Floodlight with the proper characteristics.



INDIVIDUAL LIGHT CONTROL

All Quad Floodlights have Adjustable Heads that permit each reflector to be turned freely in any direction or tilted up and down. And you tighten just one bolt to hold it in desired position.

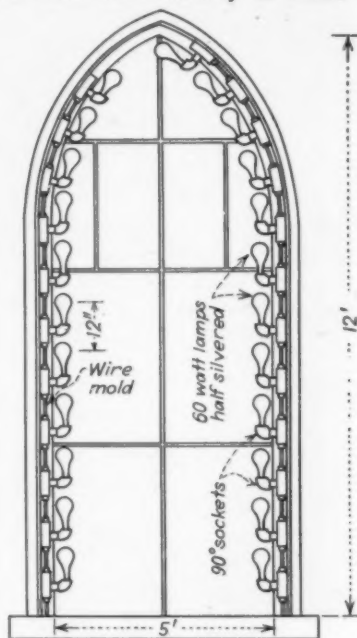
ASK YOUR WHOLESALE OR WRITE
QUADRANGLE MFG. CO.
32 S. PEORIA ST.
CHICAGO, ILL.

*Better
Lighting*

[FROM PAGE 97]

the open side turned to an angle of 45 degrees with the face of the window. Half shades or aluminum caps clipped onto the bulb may also be used.

When applied to windows without storm sash the assembly is made up



Stained glass window

Half silvered lamps

Protecting wire glass storm window

ANGLE SOCKETS—And half silvered lamps provide even lighting with a minimum of obstruction to daylight.

with conduit and threaded fitting with weather proof sockets, turned down rather than up as shown in the sketch. The lamps should be installed as far from the window as conditions permit to avoid bright spots and shadows.



AT SPOKANE FALLS—Combined mercury and mazda floodlighting provide a spectacular effect for this new service station in Spokane, Wash. This station is located on the bank of the Spokane river overlooking the Falls. Installed by the Brown-Johnston Co., there are five incandescent floods with 139,000 lumens output and three mercury vapor totalling 64,000 lumens.

A COMPANY IN THE
INSULATION BUSINESS
SINCE 1878

PERFECT ADHESIVENESS
AND TENSILE STRENGTH

STRONG DISTINCTIVE
GREEN CORE

COLORFUL ATTRACTIVE
BOXES

FIRST TO BE WRAPPED AND
SEALED IN CELLOPHANE



**PANTHER and
DRAGON TAPES**

HAZARD INSULATED WIRE WORKS

DIVISION OF
WILKES-BARRE



THE OKONITE CO.
PENNSYLVANIA

WE STILL MAINTAIN OUR ORIGINAL POLICY OF SELLING THESE TAPES THROUGH LEGITIMATE WHOLESALERS ONLY

Questions ON THE Code

Answered by
F. N. M. SQUIRES

Chief Inspector New York Board of Fire Underwriters

Inspector's Problems

"I am writing you to get your opinion on several Articles in the 1937 Code that have been somewhat confusing to us, and I would appreciate your opinion. The reason I would like to get this cleared up is the fact that we expect to start using non-tamperable fuse plugs before long in this city, and if the 15 ampere type non-tamperable fuse plugs can be used in the 220 volt circuits for water heaters, in place of the cartridge type fuse, it will eliminate the continual over-fusing of these water heater circuits.—E. E. L."

Q. 1—"Is it permissible to install two No. 4 rc wires and one No. 4 bare neutral wire in one inch conduit for services?"

A. 1—The second sentence of the fine print note following Table 2 of Chapter 9, at top of Page 265, contains the following—"For services only *** Two No. 4 Type R and one No. 4 bare conductors may be installed on 1 inch conduit."

Q. 2—"Does this bare neutral wire have to be stranded or can it be solid No. 4?"

A. 2—Section 3036 of the 1937 Code, on Page 86, requires that conductors of No. 6 and larger, installed in raceways (including conduit) shall be stranded.

Q. 3—"Is it permissible to use plug type fuse plugs on a 220 volt, two-wire circuit for water heaters, when this circuit is taken from a three-wire service, 110-220-volt, which has a neutral grounded conductor in same and is using 15 amperes for water heaters?"

"If I have interpreted Section 2431 under Article 240 Page 52 of the Code, this would be permissible. Then on Page 54, Section 2451, A Classification, it reads:—"Plug fuses and fuseholders

of the standard type shall be classified at not over 125 volts, 0 to 30 amp." And again on the same page under Section 2452-A, it again states that plug fuses and fuseholders of the non-tamperable type shall be classified at not over 125 volts.

"It seems to me that the above two sections eliminate the use of these plug type fuses on a circuit of this kind, while in Section 2431, Article 240, this would be permissible. Which is the correct interpretation to this question?"

A. 3—Section 2431 permits the use of plug fuses on systems having a grounded neutral, where the voltage to ground does not exceed 150. This permits plug fuses of both the "standard" and "non-tamperable" types to be used on the single phase 3 wire 110-220 volt or the 4 wire 3 phase sys-



INTRICATE CONTROL—Jobs require expert supervision and layout which is one reason why so many Milwaukee factories call on Orville R. Nichols of the A. C. Electric Company. A recent job required full remote control on a battery of three stage electric heaters. The job was further complicated by explosive gases, requiring installation of the main controllers as well as the control stations outside of the hazardous area.

tems, providing the system has a grounded neutral. This would, therefore, permit the use of the plug fuses on the waterheater circuits.

Q. "We have a condition here that is rather confusing to me, and I am writing to you to get your opinion. We have in our city, a number of residences that have been wired before the identified wire system was started. The greater majority of these residences have two-wired services with no ground or no identified wire. In most cases No. 8 wire was used for services.

The power company and the electrical contractors here started sometime ago a campaign to sell electric ranges and water heaters. It has been very successful. When a range is sold, of course, it becomes necessary to also install a new and larger service to this property. The house was originally wired for two circuits of lighting in most cases but no identified wire. So for a range and two circuits we use three No. 6 wires, two black and one white. The new type 60 amp. service equipment is installed and, of course, the identified wire on service is grounded to water pipe, and the three-wire circuit properly fused, is carried on to range just the same as if it were a new installation. Then we come to the circuits to be connected for the lighting which is, in most cases, two 2 wire branch circuits with no identified wires.

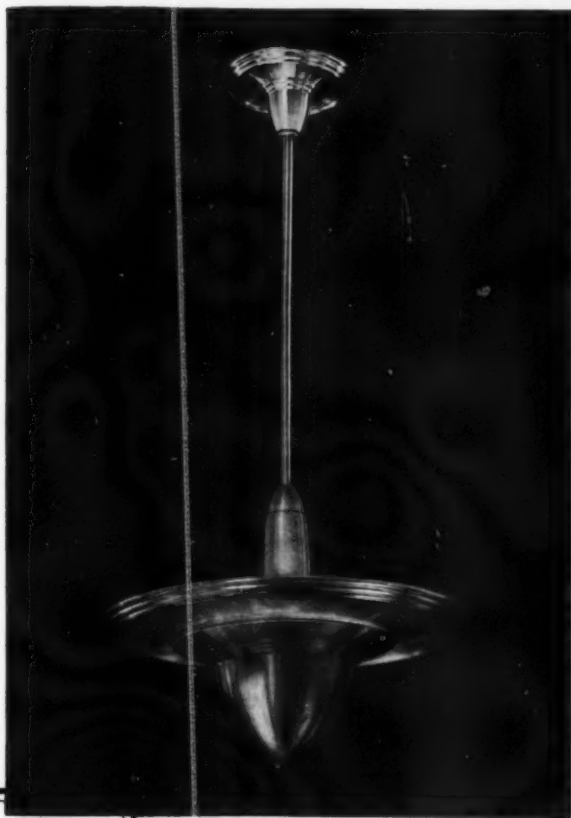
It has been the practice here that these branch circuits must be so connected that a fuse or over-current device will be in each conductor as provided in Sections 2409-B. (Conductors of branch circuits—on Page 51 of the 1937 Code.) This in many cases causes considerable extra work and I have not been able to figure out just what the advantage is of having over-current device in each conductor of these branch circuits.

Supposing the contractor in installing one of these new services was using a service switch, which has a range fuse and four branch circuits for lighting. If there are two circuits of lighting to be connected from the old wiring, we still cannot use them, as there is no way to arrange this switch whereby there can be over-current protection in each conductor. So the only thing that can be done is to use another fuse box and install a two-fuse double branch block in order to get the fuse in each conductor, thus working four fuses for the two circuits. In other words, we have four circuits for lighting in this service switch and still they cannot be used.

In your opinion, is there any danger in connecting these branch circuits to the service switch, when there can be

Another New Lustrolier

TO WAKE UP DROWSY SALES



THE NEW PERMAFLECTOR LUSTROLIER

N-591

The N-591 Lustrolier is composed of two separate bowls which allow a spill of light over the bottom of the horizontal bowl as shown at the left. The B-591 shown below is one complete bowl and is totally indirect.



A FEW USERS OF PERMAFLECTOR LIGHTING

Apartment Buildings	Food Markets
Art Galleries	Furniture Stores
Automobile Dealers	Furriers
Banks	Gymnasiums
Beauty Shops	Hotels
Churches	Jewelers
Clothing Stores	Museums
Dairy Stores	Newspapers
Department Stores	Office Buildings
Five and Ten Cent Stores	Public Buildings
	Schools
	Stock Exchanges
	Theatres

These people are YOUR prospects.

YOUR lighting prospects demand today, more than ever, an outstanding sales proposition before they will buy. They insist that lighting fixtures be attractive, efficient, and low in price!

The new Permaflexor Lustrolier N-591 presents another unusual sales opportunity because it has been well-timed to fit the above needs of present day markets. Your prospects who require decorative beauty will become enthusiastic customers when they see this new unit perform and hear of its low cost.

Offices, restaurants and retail stores are only a few of the many potential buyers of the new Permaflexor Lustrolier N-591. This large market means greater volume of sales and increased profits for you.

Write or send the coupon below for complete information on selling and installing the new Permaflexor Lustrolier N-591.

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Lighting

PERMAFLECTORS • LUSTROLIERS • LUMINAIRES • SPOTLIGHTS • URNS
FLOODLIGHTS • LAMPS • BUILT-IN CEILING UNITS • ACCESSORIES

PITTSBURGH REFLECTOR COMPANY EC-3-30
OLIVER BLDG., PITTSBURGH, PA.

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Lag Screws

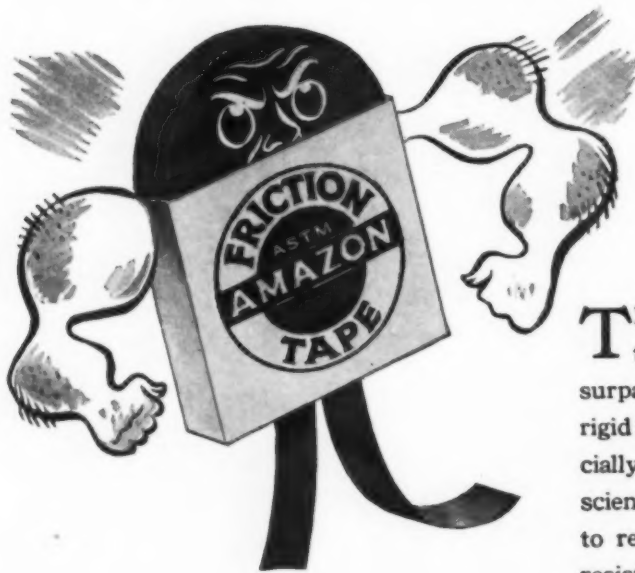
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items of interest
to you.

See the 1938 Sweets
Catalog for Paine
Catalog, Section
16/53. Lowest
prices, immediate
shipment and high-
est quality guaran-
teed.

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"I'M TOUGH"



This long-lasting friction tape consistently surpasses even the most rigid specifications. Its specially-woven fabric base is scientifically treated both to retain pliability and to resist the elements.

FRICTION TAPE (AMAZON-VICTOR-STICKA)
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OFFICES IN 85 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

Questions ON THE Code

[FROM PAGE 100]

only one fuse in these branch lighting circuits and they are not polarized, or they do not have the identified wire in the branch circuits? This would not comply with the Code but I cannot see where there is any danger in doing this and to my estimation it would be as safe to have one fuse in these circuits as it would be to have two. Please let me have your opinion on this at your earliest convenience."—E. L.

A. This question is one which has arisen many times, especially where ungrounded systems were formerly in use but have been replaced with grounded neutral systems. After a grounded neutral system service has been connected to any house it seems to be best to eliminate any fuses in what then becomes the grounded conductor of the lighting circuits.

Of course, the very best and proper way of handling the matter would be to go through the house and test the wires at each fixture outlet and socket and mark the neutral or grounded conductors at the fixture outlet with white paint and then to polarize each socket. However, it should be sufficient to test each socket and be sure each socket is polarized. In some cases the inspection department having jurisdiction might require that only such sockets, as may be within reach, be polarized and permit the others to remain as they are, where they are not liable to contact by persons.

A blown fuse in a grounded circuit wire might lead to serious consequences. With a good fuse in the live wire, but the circuit seemingly dead, a person thinking that the circuit was dead might receive a bad shock or burn.

Switch Rating on 32 V Systems

Q. "On a 32 volt plant one can have only 320 watts per circuit. If 20 ampere switches are required for wall switches, as I understand they are, that means only a 10 ampere load. Why such a heavy switch?"—A. C. B.

A. The Code does not specify that 20 ampere switches must be used on these low voltage circuits and therefore where a load of but 10 amperes is to be used on a circuit a 10 ampere switch is permissible. The Code, however, does require the use of receptacles having a rating of not less than 15 amperes (see Rule 7206 in the 1937 Code) and requires that receptacles of not less than 20 amperes ratings be used in kitchen, laundries and other locations where portable appliances are likely to be used.

Electrical Contracting, March 1938



The FUSTAT

**Stops
needless
blowing
of fuses**



Fits present fuseholders

The Fustat can be used in any Edison base fuseholder thru use of an adaptor that retails at 7½c.

*Satisfied customers make YOU the most profit
and here's how the FUSTAT comes in!*

Permits adding more appliances to present circuits

You can load an ordinary circuit right up to capacity and yet protect it with a 15 ampere Fustat. Its long time-lag keeps it from opening needlessly as when motors start on washing machines, oil burners, refrigerators and other appliances.

Thus you can expand the use of present circuits with perfect safety — and without incurring needless blowing of fuses.

Abolishes aggravating "blown-fuse" service calls

Such calls are wasteful and costly to everybody.

The user loses time and temper and often money when service is off.

The service man is dragged away from more profitable work: Contractor or dealer loses if user kicks about paying full cost of a call where the only work done was to replace a blown fuse.

The Fustat stops such senseless waste because it doesn't blow needlessly.

Protects against dangerous overloading of circuits

The Fustat cannot be replaced with a penny or other substitute for the fuse — or with a size too large to protect.

The user is protected against anyone unwittingly creating

a fire or personal injury risk thru haphazard practices that permit circuits to be overloaded. Once installed, SAFE protection REMAINS SAFE.

Nips out hazardous shorts in flexible cords

The Fustat contains a fuse. The ability of a fuse to protect against dangerous cord shorts, grounded sockets, etc., is well known.

Protective devices that do not open on short circuit as quickly as the Fustat permit the cord to burn out at the short. You get the fireworks in your face, or hands, or around the house where injury or damage may be caused or a fire started.

The quick action of the Fustat on short circuit prevents spraying of molten metal, burning of users, starting of fires.

Helps reduce user kicks about service or appliances

Users "just can't be made to understand" why other protective devices often open when there is nothing wrong.

When such needless shutdowns occur with newly purchased appliances they get particularly "hot" and generally throw the blame on whomever sold or installed the appliances.

Such user complaints hurt not only the dealer or contractor — but everybody in the Electrical Industry.

The Fustat offers a common sense way to reduce this evil to a minimum.

It's just good business to sell, install and use Fustats

The FUSTAT

For
full information
write to any
of these firms —

BUSSMANN MFG. CO., University at Jefferson, St. Louis, Mo.

JEFFERSON ELECTRIC CO., Bellwood, Ill.

KIRKMAN ENGINEERING CORP., 121 Sixth Ave., New York City

NATIONAL ELECTRIC PRODUCTS CORP., Fulton Bldg., Pittsburgh, Pa.

UNION INSULATING CO., 277 Broadway, New York City



Questions ON Signalling

Answered by
ALBERT A. SCHUHLER

Controlling Signal Periods

Q. In a call system installed in a factory, it is necessary to operate a horn for about ten seconds before starting a certain machine. What device may be secured to operate the circuit for the time stated? We wish to control this device from a push button in the factory superintendent's office.
—A.F.

A. An automatic reset time limit relay can be used for this purpose. The operation of the push button energizes the coil of the relay, and the contacts are then held together for the period of time for which the relay has been set. Then the relay is automatically reset for the next operation.

Another way to control the horn is directly from a small toggle operated time switch, having an adjustment for the period of time desired.

Executive Office Call System

Q. We desire a call system in which each executive will be able to call any of five attendants, who are located in a general office. This office is to have an annunciator arranged with two horizontal rows of five drops each. The upper row is to indicate the number of the attendant, while the lower row is to indicate the executive who is calling. Please furnish a sketch of the wiring diagram for such a system.—B.K.

A. The accompanying diagram shows a typical wiring layout for this type of system. Since this method is greatly limited it is assumed that very few calls are to be made. Many calls will cause confusion, and therefore, prompt attention must be paid to the signals.

Note particularly that the three-contact type pushbuttons are used for calling, all springs being separated normally. Individual resetting of the drops is recommended to aid in avoiding confusion, as it is necessary to reset

calls as promptly as possible. The diagram shows connections for three executive pushbutton pads and an annunciator for three attendants.

Automatic Fire Alarm Test

Q. Automatic testing facilities are desired for a fire alarm system which is at present being tested manually once each week by operating a push button. If automatic testing facilities are possible, the present manual testing feature will be used only for emergency operation.

There is also a clock system in this school which is provided with a four-circuit program instrument. Since only

two program circuits are used, is it possible to use the program instrument for automatic testing?

The fire alarm system is the open-circuit type, operated from the clock system storage battery.—F.G.

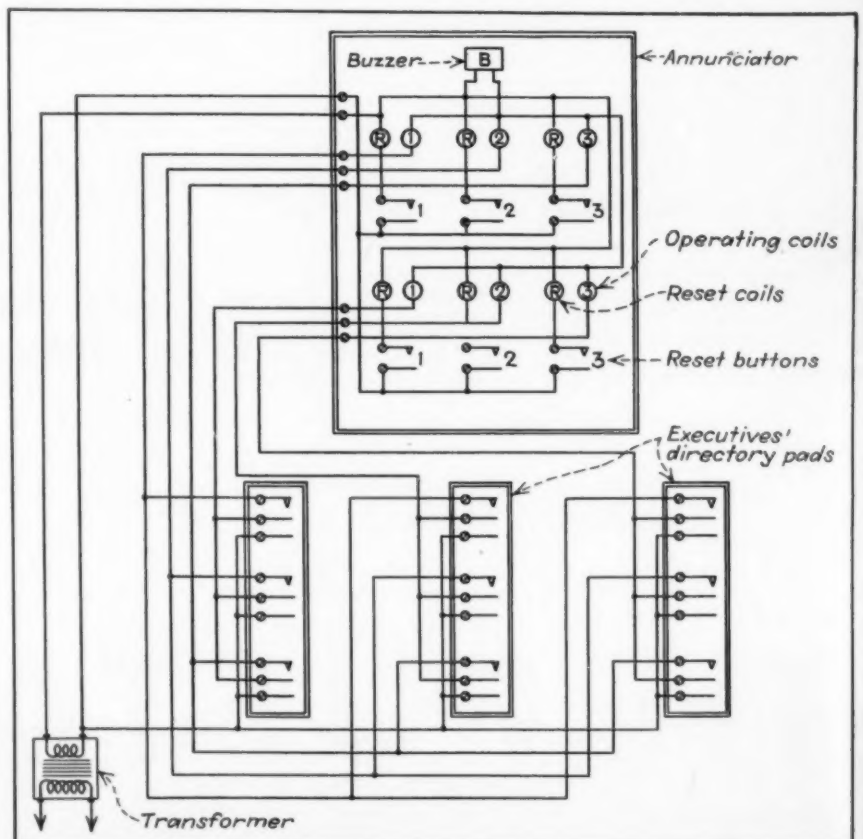
A. The program instrument may be used to provide an automatic means of testing the fire alarm system. One of the spare circuit drums, disks or tapes of the program instrument may be used. For the drum or disk type instrument, insert additional pins in the program and calendar devices in positions that correspond to the time and date when signals are desired. If the program instrument is of the paper tape type, holes must be punched in the tape to provide the proper result.

In addition, one of the circuit relays must be used. The contacts of this relay must be connected in the same circuit with the present fire alarm stations or manual test button.

Controlling Non-Coded Sirens

Q. Is it satisfactory to control large non-coded motor-driven sirens by means of knife switches? If not, what is the practice recommended?—F.B.

A. Smaller sirens, having $\frac{1}{2}$ to $\frac{3}{4}$ horsepower motors, may be operated from switches. Beyond this size, remote control switches should be used.



SELECTIVE CALLING—Annunciator hook-up that makes it possible for several executives to call specific persons.

The Unseen Hand

that makes display
lighting completely
A U T O M A T I C



Curtis Lighting Photo

A SANGAMO Time-Switch makes the difference between night and day in any display lighting installation—it turns the lights on and off as your customer desires—it does it for him automatically, economically and dependably. . . For you, the Unseen Hand brings a justly deserved profit, no part of which is ever likely to be consumed by even one service call. Your own wholesaler will confirm this.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

FOR MODERN WIRING—HERE'S A PERFECT JOINT!

Tapered spring insert presses thread into wires—acts as a current carrying sleeve, giving a pressure contact—better electrically and stronger mechanically than solder and tape.



3/4 inch molded composition unaffected by heat, cold or moisture.

IDEAL SOLDERLESS TAPELESS WIRE CONNECTORS

IDEAL thread-on Wire joints pass inspection quickly—and reduce wiring costs.

FAST—SAFE—CONVENIENT—more permanent and safer than out-dated solder-and-tape joints.

BETTER ELECTRICALLY—STRONGER MECHANICALLY. Greater conductivity than the wires it joins. Fully approved. Listed by Underwriters' Laboratories.

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SOLDER LUGS—Accurately made of pressed copper. Complete Range of sizes.

"SOLDERLESS" LUGS—Thread-on type. No screws or bolts.

CABLE RIPPER—For non-metallic sheathed duplex or lead covered cable.

FISH TAPE REEL AND PULLER—Big, safe grip. Keeps tape under control. Prevents tape breakage.

FRICTION TAPE HOLDER—Worn on belt—Tape can't be mislaid or lost.

"E-Z" WIRE STRIPPERS—For toughest insulation—solid or stranded wire.

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SYCAMORE, ILLINOIS

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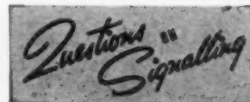
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DESCRIPTIVE BROCHURE FREE . . . A valuable handbook of localized lighting

THE FOSTORIA PRESSED STEEL CORP., FOSTORIA, O.



[FROM PAGE 104]

These remote control switches in turn are operated from approved "start" or "start and stop" control switches.

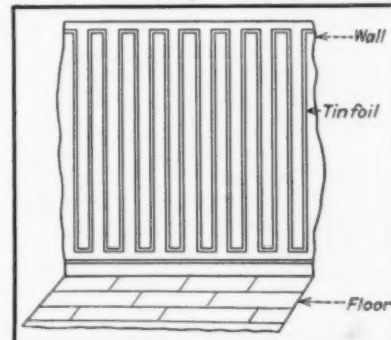
If so desired, the remote control switch may be controlled from the contacts of a relay, the winding of which may in turn be controlled or energized by means of a heavy duty push button.

Protecting Walls Against Intruders

Q. A wooden warehouse structure is to be protected against the possibility of thieves gaining entry by cutting through the walls. What suggestion may be offered to secure this protection?—R.E.S.

A. There are two general methods of providing this protection. One method is by applying tin foil or by fastening wired screens to the walls. The second method is by the use of photo-electric equipment.

The tin foil comes in one and two-inch widths and must be cemented to the surface of the interior walls for their entire height. The foil may be



BURGLAR SCREENED—Lattice-work of foil or bail wire behind moldings protects against wall-cutting thieves.

applied vertically and run back and forth at six inch intervals in accordance with the accompanying drawing. This foil may also be applied to the doors and windows, using proper contacts for connection to the permanent wiring. The surface must be dry for proper application of the foil. The wiring should be closed-circuit.

The wired screens would consist of a large number of half-round pieces of molding with grooves for inserting small bare wire made up in the form of lattice-work.

The photo-electric type of system consists of detectors, sources of light and reflectors, so arranged that anyone gaining access to the building will break the invisible rays or beams of light. With this arrangement the beams of light are parallel with the walls to be protected, and at a height to be effective.

AS AN ESSENTIAL TO
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EVERY OUTLET DESERVES A BRYANT DEVICE



Convenience
Outlets



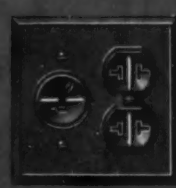
Switches



Weatherproof
Outlets



Weatherproof
Switches



Radio
Outlets



Clock Hanger
Outlets



Fan Hanger
Outlets



Outlet



Lighting Light
and Outlet



Range
Outlets

ADEQUATE WIRING provides for the comfort, convenience and satisfaction of the user—today and for the future. Modern, dependable wiring devices make the installation adequate.

The Bryant line includes attractive and dependable devices for the convenient utilization and control of lighting and appliances. A few of these devices are shown on this page. See the complete line, and the section devoted to adequate wiring, in the Bryant easy-to-use catalog.

Sold through Electrical Wholesalers

50 YEARS OF LEADERSHIP IN THE WIRING DEVICE FIELD



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NEW YORK: 100 East 42nd St. • CHICAGO: 844 West Adams St. • SAN FRANCISCO: 325 Ninth St.

In the News

INDUSTRY MEETS IN MINNEAPOLIS

Twelve selected organizations of the North Central area, held group meetings and a manufacturer exhibit in Minneapolis, February 14-17. Cooperating in this all industry program were the Minnesota Electrical Council, Minnesota Electrical Association, Minneapolis Electrical Contractors, St. Paul Electrical Contractors, Minneapolis and St. Paul Electrical Appliance Dealers, Fargo (N. D.) Electrical Contractors, North Central Electric Association, Minnesota Municipal Utilities Association, North Central Electrical Manufacturers Club, North Central Electrical Wholesalers, Minnesota Electrical Inspectors, and Duluth Electric League.

An extensive program provided separate concurrent meetings of the individual industry groups combined with a series of all-industry programs. Electrical contractors exceeded all other industry groups

in members present, with a total registration of 225.

Members of the Minnesota Electrical Council held their regular annual convention, opening with a presentation of the National Adequate Wiring Bureau campaign, by Arthur E. Schanuel. Bookkeeping and accounting systems, and a number of standard forms prepared by the Council for the use of its members, were discussed by Wm. A. Ritt, Secretary-Manager. D. W. Prideaux of the General Electric Company demonstrated a progressive job of store modernization technique.

The annual convention of the Minnesota Electrical Association concentrated on farm and rural community wiring and sales problems. W. T. Stuart, Mid West Editor of Electrical Contracting, outlined problems the contractor faces in the rural market. He urged organization activity, and the tightening of rural inspection to get the farmer to use the services of qualified contractors. Appliance sales in the smaller community and modern selling methods

were discussed by T. L. Losby of the Northern States Power Company.

A discussion of the Minnesota electrical law, led by George Garvey, field representative of the State Board of Electricity, a review of the State rural inspection program by Fire Marshall, A. N. Nordstrom, and a review of the National Electric Code by Glenn Rowell of the Underwriters Inspection Bureau, resulted in an extended meeting, after formal adjournment, to discuss farm wiring and code problems.

New officers elected were, for the association: W. S. Johnson, Duluth, President; E. J. Micka, Hibbing, Vice President, and Wm. A. Ritt, St. Peter, Secretary-Treasurer; for the Council, L. H. Gordon, Albert Lea, President; E. M. Karst, Fergus Falls, Vice President; Wm. A. Ritt, St. Peter, Secretary-Manager and F. M. Tripp, Minneapolis, Treasurer.

The all-industry meetings were devoted to talks on subjects of common interest. Speakers included W. H. Rodgers, Westinghouse Electric & Mfg. Company; Arthur E. Schanuel, National Adequate Wiring Bureau; Freeman Barnes, General Electrical Company; Dr. Geo. W. Allison, Edison Electric Institute; Wm. B. Burrus, Norge Corporation, and C. P. Wagner, Northern States Power Company. An all-industry banquet attended by 425 members and guests heard Lionel B. Moses of the *American Weekly* discuss the "high road" to sales in 1938.

ELDER STATESMEN

At the banquet at the Mid Winter Conference of the National Electrical Manufacturers Association six old timers were honored with engrossed certificates, attesting fifty years of service in the electrical industry. This half dozen pioneers, who this year completed a half century of active work for electrical progress, were Sears B. Condit, president and treasurer of Chase-Shawmut Company; Edward R. Grier, chairman, Arrow-Hart & Hegeman Electric Company; Samuel L. Nicholson and Edward H. Sniffin, both assistant vice-presidents, Westinghouse Electric and Manufacturing Company, John H. Parker, president, Union Insulating Company; and Joseph Sachs, consulting engineer, Colt's Patent Fire Arms Manufacturing Co.

WISCONSIN CONTRACTORS MEET IN MADISON

Business management and selling were the principal themes discussed at the annual meeting of the Wisconsin Electrical Association held in Madison, Wis., February 6-8. Attended by over 200 contractors and men from other branches of the industry, the Madison meeting was rated as one of the best in the history of the association.

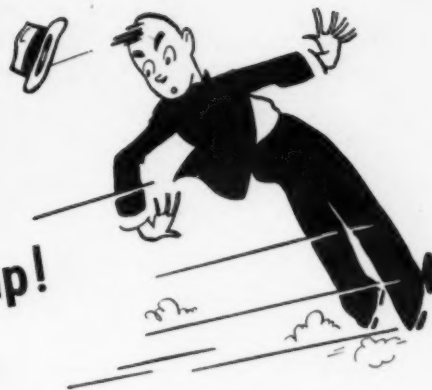
Armed with facts and figures from a financial analysis of 55 incorporated Wisconsin electrical contractors, Professor Fay H. Elwell, Professor of Accounting of the University of Wisconsin, presented a story of the contracting industry as seen through the eyes of an accountant.



That cut rate electrician saved me some money—he connected the lamp to the plug in the next apartment while the folks were out.

Private Interior Telephone Systems

Mean new profit for you. Don't pass it up!



● If you are not now selling Automatic Electric private telephone systems—recommending them for use in offices, shops, factories, homes—then you are missing some very profitable business. Here are some of the reasons:

- 1.—Business has become communication conscious, because better communication lowers costs.
- 2.—The market is as big as business itself.
- 3.—Private telephone equipment belongs definitely in your field.
- 4.—The profits are attractive.

Automatic Electric, for over 40 years manufacturers of both public and private telephone equipment, offers many types of private interior systems. This line includes the simple and inexpensive two station outfit which works on dry cells, the nationally advertised P-A-X (Private Automatic Exchange) for the big job, and a wide variety of "in-between" types.

The systems shown below are typical. Our field representative will be glad to supply literature, prices and discounts, as well as work with you on specific jobs.

INTERCOMS

Common-talking, selective-ringing systems in capacities of two to eleven stations. Beautifully designed, and durably constructed for long faithful service.

SERV-U-FONES

Attractively priced common-talking systems in capacities of two to ten stations. Conveniently packaged, simple to install. Dry cell operated.



AUTO-COMS

Deluxe intercom. systems, providing selective talking and selective signaling service for a maximum of ten stations, and up to five connections at one time. No automatic switchboard needed.

P-A-X's

Private Automatic Exchange systems, available in all capacities. Use standard automatic telephones and provide for a variety of special communication services.

AUTOMATIC ELECTRIC

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Sales and Service Offices in Principal Cities. In Canada: Canadian Telephones & Supplies, Limited, Toronto

He showed overhead costs varying from 50 per cent to 23 per cent of net sales with the advantage in favor of the larger contractor.

The industry is losing hundreds of thousands of dollars annually, he said, through failure to apply bookkeeping facts.

Compensation rates affecting the electrical contractor was the subject of an informative paper presented by A. S. Kuenkler of the Wisconsin Compensation and Rating Bureau.

In an appeal to the contractors to take adequate wiring to the public, I. L. Illing of the Milwaukee Electric Railway and Light Co. urged the contractor to tell his story with mechanical demonstrations and instruments. A talk on highway lighting by C. H. Rex of the General Electric Company resulted in a resolution to drive for the lighting of highway death traps. Cooperation with other branches of the industry was urged by Paul DeLeon of the Wisconsin Power & Light Company and J. C. Schmidtbauer of the Westinghouse Electric Supply Company and E. J. Brown of I.B.E.W. He asked the contractors to help bring new blood into the industry through a planned apprentice program.

Otto A. Braun of Madison said that the contractor should be in a position to sell complete electric kitchens, just as the plumber sells bathrooms. Henry Trester, of Milwaukee, described modern methods of handling motor repairs. He emphasized the distinction between rebuilt motors as sold by a qualified motor shop under a guarantee and the ordinary used motor. Progress in rural electrification, under the R.E.A. program, was outlined by John A. Becker, of the Rural Electrification Coordination office at Madison.

Officers re-elected for 1938 were, Roy Springer, President; R. J. Nickles, Vice President; William Merkel, Treasurer and E. H. Herzberg, Executive Secretary. The new panel of directors elected were R. F. Poland, C. L. Kehl, Wm. Chamber-

lin, L. C. Hackbarth, E. P. Kessinger, R. J. Conklin, Ed Killoren, Joseph Josephsen and H. F. Trester.

COMING MEETINGS

National Industrial Service Association—Chicago, Illinois, April 25-27.

National Fire Protection Association—Atlantic City, N. J., May 9-13.

National Electrical Manufacturers Association—Spring Conference, The Homestead, Hot Springs, Va., May 15-20.

National Electrical Wholesalers Association—Annual convention, The Homestead, Hot Springs, Va., May 22-26.

New York State Association of Electrical Contractors and Dealers—Big Moose, Adirondacks, N. Y., June 20-23.

BIG ONTARIO CONVENTION

Ontario contractors turned out for a two day convention in Toronto, January 26 and 27, with J. H. Turvey of Brantford as president and George Patterson of Toronto chairman of the program. On Wednesday, W. R. Ostrom, of Northern Electric, talked on wholesaler and contractor relations; J. S. Keenan, of Canadian General Electric, on business building by contractors; George Patterson on market opportunities; and H. J. McCaw, of Ontario Hydro, on equipment control through licensing. Earl Whitehorne was the banquet speaker, his theme rewiring.

Thursday's session presented Les Gibson, of the McLean Publications, on advertising; George Austen, of the Toronto Electric Service League, on "The Contractor's Place in the Sun"; W. A. Millen, of Windsor, on cost plus selling; R. Hueston, of the Ontario Hydro, on co-operation; N. McLeod, of the League, on commercial lighting; C. Curtis, of Johnson-Turner, London, on motor shop problems; and G. Williams, of Hamilton-Sterling, on power factor correction. A motor shop group was organized. Officers for the coming year were: president, Jas. H. Turvey; first vice-president, W. Bennie, Hamilton; second vice-president, Gordon Alexander; chairman of the educational committee, George Patterson; chairman of publicity, R. Turner, Wind-

sor; chairman of finance, J. Harris, Kingston; chairman of legislation, W. A. Millen, Windsor; chairman of membership, R. Mitchell, Toronto; secretary-treasurer, John O. Schatzke of Kitchener.

ADEQUATE WIRING FIELD MEN

Two men are already in the field for the National Adequate Wiring Bureau to help local groups get going with the campaign. They are Art Schanuel and Andy Tait. A. E. Schanuel has been directing promotional programs in electric refrigeration,



A. E. Schanuel



A. C. Tait

ranges and air conditioning for distributors and dealers in St. Louis. A. C. Tait has been promoting the Red Seal program in Buffalo for the Electrical League of the Niagara frontier and was active in the Five Star Home campaign. From now on they will be traveling the country helping with the wiring plan. Watch out for them.

NISA SHOPMEN TO MEET IN CHICAGO

The 1938 Convention of electrical service shops, sponsored by the National Industrial Service Association, will be held in Chicago on April 25th, 26th and 27th. Every service shop in the United States is cordially invited and asked to make plans to attend the Convention.

The practical nature of this convention is indicated by the following tentative program—

Shop Records and Procedure
Annual Summary of Rewind Prices



WISCONSIN LEADERS—Officers and directors of the Wisconsin Electrical Association gather 'round at the close of annual meeting (seated) R. E. Poland, Field Secretary C. F. Gross, President R. W. Springer, Vice President R. V. Nickles, (standing) C. L. Kahl, Wm. Chamberlin, L. C. Hackbarth, E. P. Kessinger and R. I. Conklin.

**PROFITS FOR YOU IN
G-E FLOODLIGHTING**

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USED-CAR DEALERS IN YOUR COMMUNITY



SELLING used cars is the new-car dealers' toughest problem. Most dealers operate open-air salesrooms where, at night, a moderate level of G-E Novalux floodlighting has real value in increased customer drawing power, attractiveness of display, ease of inspection and demonstration, safety and convenience to salesmen and customers, and protection of property from loss or damage. The dealer needs these advantages.

When you sell him G-E Novalux floodlighting you stand to gain a profit on the floodlights, poles, wire, switches, and other supplies, as well as on the labor of installation. This total business is well worth going after.

Used-car lots are simple enough to light effectively. Any G-E floodlight distributor or the nearest sales office of the General Electric Company will gladly furnish information on appropriate G-E Novalux floodlights and suggestions for their use. If you are in doubt as to where to get this information, write the General Electric Company, Schenectady, N. Y. There are profits for you in G-E floodlighting. Check up on your prospects—and especially at this time, the used-car dealers in your community.

GENERAL  **ELECTRIC**

500-275

"THE PERFECT LIGHT"...



OFFERS YOU THE
PERFECT ANSWER TO
MORE
INSTALLATIONS
AND PROFIT

Here is high quality at low price—this unit really makes a fine appearance—customers approve the illumination the minute it is installed. Made of heavy gauge steel—switch easily installed in center—pull chain extends through knob—and here is something—this unit is quickly attached to any outlet box or fixture stud. The Perfect Light is designed with bracket for instant assembly and adjustment. Chrome finish.

THE GLEASON SALES COMPANY

35-37 S. DESPLAINES ST.

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CHICAGO, ILL.

SEE YOUR
WHOLESALE
or WRITE US NOW
Get this unit
working for you
**MADE IN
4 SIZES**

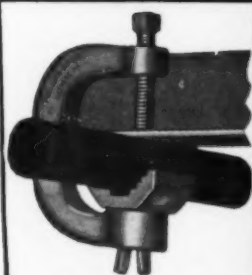
FLOOR BOXES and



No. 252-R
TWO GANG BOX

Two gang Adjustable Floor Box with No. 208 Receptacle in one section. One cover plate with 1/2" Flush Brass Plug and the other cover plate with 2" Flush Brass Plug.

WIRING SPECIALTIES



No. 470 PIPE OR
CONDUIT HANGER

Pipe support can be turned freely, permitting pipe to run parallel, or at right angles to beam. Eliminates drilling or use of straps. Will accommodate sizes of 1/2", 3/4" and 1" pipe to steel-beams 3/4" thick.

Sell and install
LATROBE—the complete line for residential, commercial and industrial work.
Catalog on request

FULLMAN MFG. CO.
LATROBE · PENN.



No. 285 DOUBLE
DUPLEX RECEPTACLE
NOZZLE

The most attractive, compact and easy-to-install fitting on the market. Shown in illustration with No. 200 Cover Plate.

In the News

[FROM PAGE 110]

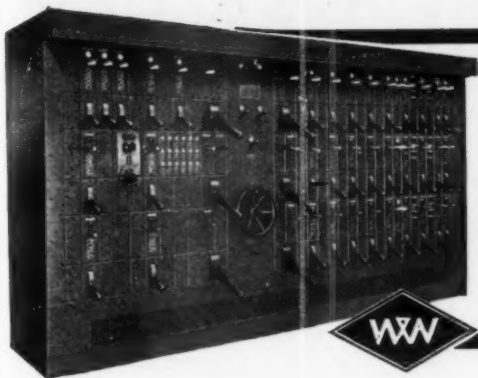
New Shop Methods
Modernizing the Electrical Repair Shop
Winding data for the Service Shop
Cost and Accounting Suggestions for Service Shops
New Equipment Resale Discounts and Franchises
Rebuilt Equipment Resale Discounts and Guarantees
Selling Electric Motor Service
Certified Electrical Repair Shop Plan
Motor Inspection Service
Methods of Compensating Salesmen
A study of Labor and Material Rewinding Costs
Labor Relations
Relation of Industry with Government
Handling Fractional Motor Repairs
Members of the industry are urged to immediately send in suggestions for topics of discussion, whether or not they are shown on the tentative program. Suggestions may be mailed to NISA Headquarters, 500 Fifth Avenue, New York, N. Y.

BOSTON'S FIFTH ELECTRICAL TRADE SHOW

The Fifth Annual Electrical Trade Show, sponsored by the Electrical Manufacturers' Representatives Club of New England, will be held at Exhibition Hall, Boston Garden, Boston, Mass., on March 9, 10, 11. The 1938 show is expected to comprise one hundred and twenty exhibits displaying the products of more than four hundred manufacturers. Factory engineers and plant executives will be in attendance to lend their assistance in describing the individual products with which they are associated.



INDUSTRIAL WIRING—Specialist, Walter Robn of the Geo. F. Robn Electrical Company of Milwaukee. In addition to a large industrial wiring business, their complete machine shop is equipped to turn out special panelboards, switchboards and pull boxes.

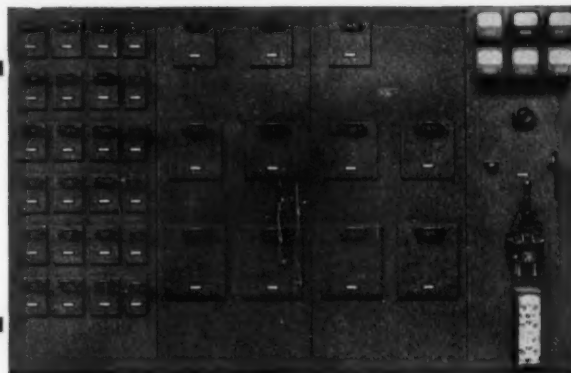


WURDACK REMOTE CONTROL STAGE SWITCHBOARDS

- Are designed for all types of Theatres, Auditoriums, Fraternal Buildings, and Schools where a modern system of lighting control is desired. Outstanding features are simplicity of design, convenience of arrangement, and ruggedness of construction. Each installation is carefully engineered to meet its peculiar requirements.

WURDACK DEADFRONT SWITCHBOARDS

- Of the Auto Shift Type are constructed of one-piece cold rolled steel panels with opening cut for individual Auto Shift Switch Units. These units are so constructed that all parts are dead when door is open. Fuses are mounted on insulated bases on back of steel inclosure, eliminating all heavy parts from door.



You Can Depend on WURDACK EQUIPMENT

Wurdack Equipment has many contractor friends because this line has given them the correct answer and made money for them time after time. The complete line includes panelboards, circuit breaker panels, distribution panelboards, and remote control stage switchboards. Design simplicity and ruggedness of construction alone make this line worthy of your immediate investigation. There is always the right size and design for the job—you can be sure with Wurdack. Write for details.

... for successful and profitable results regardless of the requirements ...

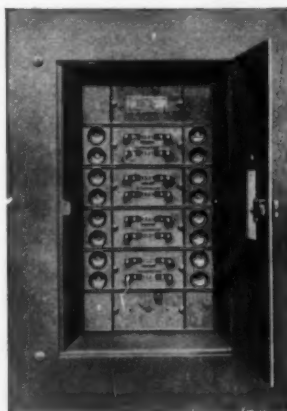
WM. WURDACK ELECTRIC MFG. CO.

General Office and Factory

4444 Clayton Avenue

St. Louis, Mo.

SALES OFFICES IN PRINCIPAL CITIES



WURDACK PANELBOARDS

- A complete line of Dead Front Lighting Panelboards, constructed of standardized sections of moulded Bakelite. All switches and fuse receptacles are readily removable from front of panel. All Cabinets made of Code Gauge Galvanized Steel. Fronts of full finished cold rolled steel, rust-proofed with black lacquered finish.

WV

When you install

WURDACK EQUIPMENT

you insure a modern job . . .

- ★ THE UTMOST IN CONVENIENCE
- ★ COMPLETE DEPENDABILITY
- ★ ALL AROUND SATISFACTION

BUCHER PRESIDENT OF WESTINGHOUSE

George H. Bucher, has been elected president of the Westinghouse Electric and Manufacturing Company, succeeding Frank A. Merrick who becomes vice chairman. Mr. Bucher joined Westinghouse in 1909 and has had a spectacular rise.

He was first employed as a mechanic in the assembly line in the East Pitts-



GEORGE H. BUCHER

burgh plant and was successively coil winder, transformer assembly man and motor generator tester. He was promoted to the administrative staff and in 1920 became assistant to the general manager of the Westinghouse International Company and a year later was made general manager. In 1934 Mr. Bucher was elected president of the International Company and the following year became vice president of the parent company.

NEW YORK ASSO. ELECTS BUSH

At its annual meeting the Electrical and Gas Association of New York, Inc. elected A. Lincoln Bush as its president for 1938, to succeed C. E. Stephens, vice president, Westinghouse Electric and Manufacturing Co. Mr. Bush is president of the Belmont Electric Company, Inc.

Other officers elected were: first vice president, E. F. Jeffe; second vice president, J. H. McKenna; third vice president, H. H. Cuthrell; fourth vice president, David S. Youngholm; treasurer, P. Schuyler Van Bloem; secretary, S. J. O'Brien; and assistant secretary, H. C. Calahan.

CHICAGO CERTIFICATION BOOSTS ADEQUACY

Among the jobs handled during the 1937 season under the Certified Wiring activity of the Electrical Association of Chicago,

400 were analyzed to see what had been accomplished. It was found that 1028 outlets were added to original plans to bring these jobs up to standard requirements. Also 1841 outlets were added to original plans in excess of standard requirements, making in all a boost of 2869 outlets to the original layouts. The final count for these 400 jobs revealed 28,775 outlets or an average of nearly 72 outlets per job as compared to an average of 64 outlets originally.



Photo Parade

Many contractors display framed photographs of outstanding jobs in their offices. These pictures usually indicate the common types of work done. At the Industrial Power Equipment Co. in Baltimore, are many pictures of racing establishments and their "Tote" or bet calculating systems. This is an important engineering and installation activity of this firm.

Landlord Relief

Saws and hammers are busy while remodeling goes on for the new 16,000-sq.ft. quarters recently purchased by Chewing and Wilmer, Inc. of Richmond, Va. This industrial contracting firm's business had grown until more office and warehouse space was needed. The new quarters will place under one roof all stock and tools that go with a diversified business.



JUNK NOT BUNK—The adage about the wife who could throw more out the backdoor than her husband could bring in the front, has its parallel in the electric business, according to J. W. Jenner of the Shelley Electric Co., Wichita. "I keep a junk box in the shop", he says. Every scrap of conduit, wire, that ordinarily is scattered about a job is brought back and put in this box. Just yesterday I sold \$30 worth of junk that would otherwise be lost. Junk is not the bunk."

Home Rules for Adequacy

The new electrical ordinance in Fond du Lac, Wis., requires all kitchen electrical appliances be placed on a separate circuit, according to G. L. Rothe, city electrical inspector. All residential lighting branch circuits must be protected by automatic circuit-breakers instead of fuses.

Trade-in Profiteer

According to O. J. Mueller of the Mueller Electric Co., Philadelphia, a local residence wiring contractor has realized a fair profit on range installations, through the salvage value of the old 30-amp. service materials, taken down when the new range service was put in.

Winders' Marathon

When a Canadian paper mill lost the windings of six 2800-hp. motors at one crack, the Thomson Electrical Works, Ltd. of Montreal never stopped operations in its shop for six weeks. According to shop superintendent Flowers, his crew of 80 workers knew just how some of those marathon performers in the States feel at the finish.

Wiring Idea

Even though a gas range is definitely planned for a new home, there is every reason to sell an electric outlet at the range location, says Harold G. Hoffman of Buffalo. He reports success through pointing out that many gas ranges have a clock or light on them. Besides, many electrical kitchen gadgets may be operated atop the low-flung range models that are now being used.

Kitchens Galore

Our National Capitol has time for electrical modernization, judging the recent news that Washington now boasts 3537 All Electric Health Kitchens. In a six weeks campaign 289 ranges were reported sold by retailers.

Photo-Cell Selling

With so much being said and done these days about "electric eye" applications, the National Electric Company of Passaic, N. J., recently sent out a printed folder on this subject to its industrial list. It suggests ways to use electronic devices in modernization for increased plant efficiency and safety.

Paging Service

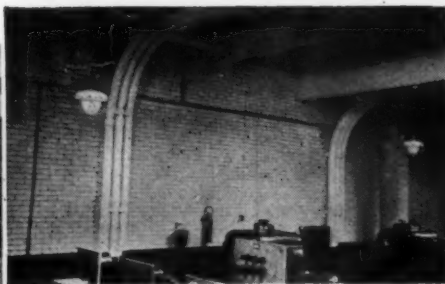
Not every contractor can keep some one in the office at all times. In the case of Ross Electric Shop in Harrisburg, Pa., the office telephone is hooked up in multiple with the Ross suburban home and Mrs. Ross takes calls by prearranged schedule during such hours as the office is locked.

Electrical Contracting, March 1938

YOU SAVE ON INSTALLATION...

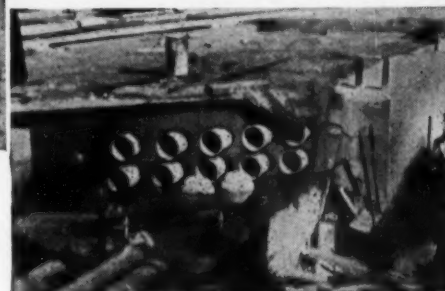


(Above) A MULTIPLE-DUCT SYSTEM being installed with Transite Korduct. Korduct, differing only in wall thickness from Transite Conduit . . . provides the same outstanding advantages of permanence, incombustibility, resistance to corrosion and immunity to rot and decay.



(Above) THIS EXPOSED INSTALLATION called for a conduit that was permanent, incombustible and provided negligible upkeep. Transite Conduit—an asbestos-cement product—answered all these requirements.

(Below) ON THIS BRIDGE STRUCTURE, J-M Korduct was the conduit chosen because "concreting-in" was necessary. Here Korduct's light weight and long lengths saved money on handling and labor expense.



UNDERGROUND Johns-Manville Transite Conduit assures years of virtually maintenance-free performance. And you save on installation . . . for this durable conduit is so strong it can be laid without an envelope . . . hence it eliminates all "concreting-in" costs.

Your Customers save on Maintenance

HERE are two electrical conduits that assure complete all-round satisfaction! Permanent, by nature of their asbestos-cement composition, both Transite Conduit and Transite Korduct effect sizable economies for you and for your customers.

Underground, *without* a concrete envelope, Transite Conduit's strength eliminates concreting costs . . . provides tremendous savings. Underground, *with* a concrete envelope, Transite Korduct . . . a thin-walled conduit . . . assures savings in labor and handling expense, due to its

light weight and long lengths. And their common durability . . . high resistance to corrosion . . . incombustibility . . . produce the further economies of years of virtually maintenance-free service.

In all exposed locations, too, you

get the same assurance of continued economy. For Transite is incombustible . . . weatherproof . . . unharmed by smoke or most corrosive fumes. Thus, from your customers' viewpoint and your own, Transite stands out as the ideal material to use on all electrical conduit jobs.

Johns-Manville
TRANSITE CONDUIT
for use underground without concrete envelope and for exposed locations
TRANSITE KORDUCT
for installation in concrete



For complete details on the many outstanding advantages of Transite Conduit and its thin-walled companion, Transite Korduct, write for our free engineering-data sheets. Address Johns-Manville, 22 East 40th Street, New York City.

About NECA

LABOR RELATIONS COMMITTEE

A mail ballot of the NECA membership for the election of Divisional representatives on the Labor Relations Committee, resulted as follows—

Div. 1. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut. **HARRY A. PIERCE**, 77 Bayley St., Pawtucket, R. I.

Div. 2. New York, New Jersey. **R. A. GOELLER**, 420 Lexington Ave., Room 1401, New York City.

Div. 3. Pennsylvania, Delaware, Maryland, District of Columbia. **J. R. WILLIAMS**, 1201 Plaza Bldg., Pittsburgh, Pa.

Div. 4. Ohio, West Virginia, Kentucky. **GEO. P. FUERST**, 719 Caxton Bldg., Cleveland, Ohio.

Div. 5. Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi. **W. W. INGALLS**, 961 S. W. 2nd St., Miami, Fla.

Div. 6. Michigan, Indiana, Illinois, Wisconsin. **ERNEST D. BROWN**, 2470 Grand River Ave., W., Detroit, Mich.

Div. 7. Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Colorado. **H. M. HEYSINGER**, 320 Harrison St., Davenport, Iowa.

Div. 8. Arkansas, Louisiana, Oklahoma, Texas, New Mexico. **WM. K. GRACE**, 1002 Allen Bldg., Dallas, Texas.

Div. 9. California, Nevada, Arizona. **CLYDE L. CHAMBLIN**, 639 Mission St., San Francisco, Calif.

Div. 10. Washington, Oregon, Idaho, Montana, Wyoming, Utah. **S. G. HEP-
LER**, 2021 Third Ave., Seattle, Wash.

Div. 11. Eastern Canada. **GEO. W. PATTERSON**, 9 Richmond Street, E., Toronto, Ont.

Div. 12. Western Canada. **C. H. E. WILLIAMS**, 608 Lumbermens Bldg., Vancouver, B. C.

Arrangements have been made for the Labor Relations Committee to meet at the LaSalle Hotel in Chicago, Illinois, on Monday, April 4, 1938. Upon assembling, the committee will elect its own chairman and proceed with its duties as set forth in the resolution adopted at Los Angeles. This provides that—

"The duties of this committee shall be only to formulate a plan with reference to labor relations, which plan is to be submitted to the Executive Committee, who upon approval will refer same to the Chapters and membership for ratification."

In order that the Labor Relations Com-

mittee may have before it an agenda for its deliberations, representatives on the committee are inviting suggestions from members of the electrical contracting industry. Contractors having recommendations to submit are urged to write to their divisional representative as listed in the committee personnel shown above.

MISUSE OF DISCOUNTS

The NECA Executive Committee, at its mid-winter meeting in New York, January 26th to 28th vigorously condemned the misuse of wholesaler discounts extended to electrical contractors classified as jobbers. It was recommended that wherever evidence of price discrimination is obtained in such cases, charges against the offenders be filed with the Federal Trade Commission under the Robinson-Patman Anti Price Discrimination Act.

The following resolution was adopted by the Executive Committee:

WHEREAS, The classification "Electri-



MARYLAND COOPERATION — *F. M. Meredith, of the Industrial Power Equipment Co. of Baltimore, is secretary of the Maryland Chapter of NECA. The Chapter carries a cooperative ad in the Baltimore classified telephone directory and his office receives telephone inquiries from the public and refers the caller to members. The ad displays the NECA emblem and states "our members are qualified reputable contractors . . . and shops . . . pledged to maintain the highest standards of material, workmanship and fair prices." Some 15 members are listed, whose names also appear individually in alphabetical order.*

cal Contractors", as set forth in the Constitution of National Electrical Contractors Association, is defined as the business of erecting, installing, servicing or maintaining electric wiring, devices, appliances or equipment, *including the purchasing from suppliers* and the selling of manufactured parts and products on a fair competitive basis with other electrical contractors:

THEREFORE BE IT RESOLVED, That no member shall make use of wholesale discounts to secure advantages to the direct or indirect benefit of his contracting business, through classification as an electrical wholesaler of any person, firm or corporation associated or allied with his business.

NECA FIELD MAN APPOINTED

J. H. Dyer, of Atlanta, has been appointed by NECA as a Field Representative for the southeastern states to work in cooperation with the NECA Southeastern Industrial Chapter. Mr. Dyer has started his work in the field in North Carolina, after three weeks of intensive training at National Headquarters in New York City.

Mr. Dyer is a native of Tennessee and a Georgian by adoption, having made his home in Atlanta for the past twenty years. For ten years he has been in the electrical specialty business, selling electrical merchandise through the Southeast. During this time he has contacted electrical contractors, dealers, jobbers, architects and builders, much of his effort being in sales promotional work.

Before leaving for the field, Mr. Dyer made the following statement in a letter to the Association officers:

"I am tremendously impressed by the service of the National Electrical Contractors Association and its importance to each electrical contractor. I feel that the qualified electrical contractor is the backbone of the electrical industry.

"I am convinced that no electrical contractor who hopes to build a sound and permanent business for himself, can afford not to be a member of NECA. The direct benefit which the member gains through the experience of all of his fellow members is valuable to him. Also he has a responsibility to add his membership strength to the influence of the National Association to help building better trade relations with the other branches of the industry."

PERKIN'S SELECTS COLLINS

J. W. Collins, Chairman of NECA Apprentice Training Committee, has been appointed by the Department of Labor, as a member of a general apprenticeship committee for the construction industry composed of five representatives each from employers and labor.

The following letter from Secretary of Labor Perkins was submitted to the NECA Executive Committee. The Committee expressed its pleasure by a formal resolution at this recognition of the splendid service

Electrical Contracting, March 1938



**"IT'S A
NATURAL**

**TO SELL TO
SERVICE STATIONS"**



The COMBINATION STANDLITE

TWO LIGHTS IN ONE

"Here's your chance to get orders from the gas station owners in your community! Give them the brilliant lighting they need to attract more customers—give it to them at lower cost—and treat yourself to some extra profits on a fixture that sells itself.

ILLUMINATES PUMP ISLANDS—FLOODLIGHTS BUILDINGS

"It's a brand new idea—combines pump island illumination with close-up floodlighting to make buildings stand out sharply. Does it better than larger floodlights mounted at lot corners . . . uses smaller lamps, consumes less current. The small floodlight atop the Standlite has universal adjustment for proper 'positioning.' It's finished in porcelain enamel, fitted with a water-tight glass lens—a weatherproof, permanent fixture. Try it on a few service stations and see how quickly it sells.

"But first—write us for complete information. Ask for catalog sheet on the Combination Standlite."

Sunny Lumens
the Goodrich Reflexpert



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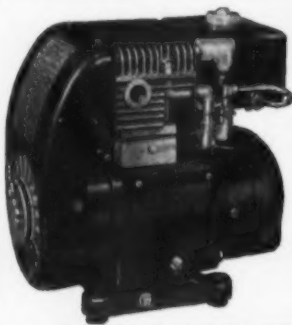
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Complete Electric Plants



NEW

1938

Models

A UNIT FOR ANY PURPOSE

In the COMPLETE LINE OF ONAN ELECTRIC PLANTS are AC and DC types, 5, 12, 32 and 110 volt, also AC-DC Combination Units. Sizes 350 to 5000 watts to meet the requirements of THOSE WHO MUST PROVIDE THEIR OWN ELECTRICITY for FARMS, SUMMER CAMPS, COTTAGES, BOATS, COMMERCIAL PURPOSES and STANDBY SERVICE. Run on Gasoline, Gas or Kerosene.

OPERATE HOUSEHOLD APPLIANCES

RADIO, WATER PUMP, MOTORS—anything that normally would operate from city lines. WILL RUN PUBLIC ADDRESS and SOUND CAR EQUIPMENT. The sale of an Electric Plant calls for WIRING, FIXTURES, APPLIANCES which mean additional profit.

WRITE FOR DETAILS ON

Liberal Dealer's Proposition and territory assignment.

D. W. ONAN & SONS

1297 ROYALSTON AVE., MINNEAPOLIS, MINN.

YOU CAN'T GO WRONG— if you "RELY ON RELIANCE"



A complete line of thoroughly dependable quality time switches with innumerable exclusive features, giving you more time switch sales opportunities.

For 28 years the name of Reliance has stood for the best in the time switch field. A good line to handle because profits are not eaten up by expensive come-backs.

See your wholesaler or
write for complete descriptive literature

RELIANCE AUTOMATIC LIGHTING CO.

1937 MEAD STREET

RACINE, WIS.



UNUSUAL LIGHTING—jobs are all in the day's work for Rudolph Knoerr of Knoerr & Fischer, Milwaukee electrical contractors. Two recently completed jobs include a specially designed skylight in a bank building simulating daylight, and a dining room lighted by reflectors set in window-like, louvered niches, giving the appearance of sunlight shining through venetian blinds.

Material for this department is supplied by the headquarters staff of the National Electrical Contractors Association, 420 Lexington Avenue, New York.

Keep UP-TO-DATE on new developments through this

INSULATING MATERIALS

1. A guide book on electrical insulating materials, giving description and price lists on insulating papers, asbestos sleeving and tape, cotton tapes, twines, transformer, cable filling and pothead compounds, flexible varnished tubing, mica, friction tape and splice, varnished cambric, armature wedes, soldering paste. Mitchell-Rand Insulation Co., Inc.

LIGHTING FIXTURES

2. A bulletin describing three sizes of lighting fixtures. Key hole slots for quick mounting to any outlet box. Not suitable for switch. Also lists sizes, weights and prices. The Gleason Sales Co.

HOME WIRING

3. A booklet entitled "Your Home with Adequate Wiring." It shows convenience of the path of light from room to room and the advantages of wired-in radio, warning lights, ivorylite devices and 2-circuit receptacles. The Arrow-Hart & Hegeman Electric Co.

AUTOMATIC TRANSFER SWITCHES

4. A 20-page bulletin on mechanically held automatic transfer switches. Profusely illustrated with diagrams, charts and technical information. Automatic Switch Co.

INDUSTRIAL LIGHTING

5. A folder featuring the "Light-Hood" for industrial lighting. Installation pictures are presented together with a table of intensities and specifications. Curtis Lighting, Inc.

FLOODLIGHTING

6. A floodlighting layout for outdoor ice hockey rinks. Gives complete information for spacing of light sources, mounting heights, lamp intensities, etc. Also information on floodlighting for roller skating rinks. Goodrich Electric Co.

WALLPAPER REMOVER

7. A folder describing and illustrating the Volcano electric-steam wallpaper remover. Volcano Corporation.

POWER & POLE LINE EQUIPMENT

8. Catalog No. 37P, has 240 pages of data on power and pole line equipment. Sections give descriptions and illustrations on motors, industrial control, industrial heating, switchgear, cable, instrument, meters and time switches; transformers, lightning arresters, fuse cut-outs, voltage regulators, power-factor improvement, street lighting, poles, arms, pins and pole line hardware, insulators and miscellaneous items. General Electric Supply Corp.

NO POSTAGE NEEDED

"Knowledge is power." Know the developments in your field. Circle the numbers of the items you want on reverse side of this card and mail today.

NEW FREE SERVICE

Electrical Contracting brings you the latest literature of leading manufacturers without cost or obligation—

PORCELAIN PRODUCTS

9. A series of five bulletins describing non-metallic wiring accessories; all-porcelain boxes, covers, receptacles; porcelain wireholder insulators; guy strain insulators; standard porcelain and distribution line insulators. Illinois Electric Porcelain Co.

INSULATION

10. A 34-page book describing how Okonite rubber insulation is made and giving tables on resistance, thicknesses, diameters and installation data pertinent to rubber insulated cables for service up to 5,000 volts. Also includes many illustrations. The Okonite Company.

INSTRUMENTS

11. Catalog No. 1550, consisting of 40 pages describing and illustrating the "Megger" insulation-testing instruments. Includes types and ratings that meet practically all demands for portable instruments. James G. Biddle Co.

DIRECT CURRENT MOTORS

12. Bulletin 2260, featuring direct-current motors designed to meet a wide range of requirements. Construction details are described and illustrated. Fairbanks, Morse & Co.

BEARINGS

13. Catalog 380, containing 64 pages of information and data on bronze bearings. Also special sections on oil grooving, flanged bearings and bushings. Johnson Bronze Co.

PARKWAY CABLE HANDBOOK

14. A new handbook discussing the application, construction and physi-

cal properties of Parkway Cable, together with information relating to "current carrying capacities" and cable jointing instructions. Anaconda Wire & Cable Co.

LIGHTING FIXTURES

15. Catalog 38, consisting of 64 pages, illustrating all types of lighting features, with detailed data and prices on each unit. Beardslee Chandelier Manufacturing Co.

BATTERY CHARGERS

16. A folder describing and illustrating battery chargers for automobile, radio, talking picture and lighting batteries, heavy duty garage type, fast rate chargers, battery servicer and charging rack. Also gives prices. Killark Electric Manufacturing Co.

CAPACITOR MANUAL

17. A new edition of the Aerovox Industrial Capacitor Manual deals with ratings, required capacities, power factors and other engineering and servicing aspects of motor-starting capacitors. Self-calculating charts are included for figuring out necessary mathematical problems. Electrolytic and oil-filled capacitor listings cover the requirements of all standard capacitor starting motors. Aerovox Corporation.

STORE LIGHTING

18. A folder entitled "Storelite A New Luminaire Designed To Sell Merchandise" describes a new unit for lighting merchandise displayed on counters and shelves. Included are construction features, application data and illumination tables. Westinghouse Electric & Manufacturing Co.

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ELECTRICAL CONTRACTING

330 West 42nd Street

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New York, N. Y.

AUTOMATIC BOILER REGULATION

19. Catalog No. 5001 describes the automatic boiler regulation for boilers under 1000 h.p., operating at pressures up to 300 lbs. Also includes steam damper regulator, over-fire control, control valves, pulleys, brackets and chain and typical applications. Features many illustrations. The Brown Instrument Co.

VOLTAGE REGULATORS

20. Bulletin GEA-2544 illustrates the feeder voltage regulators. Details on induction, step and booster types. General Electric Co.

SWITCHBOARDS

21. A folder describing and illustrating the "F.O.I." (Front operated-interlocking) dead-front switchboards. Includes construction features, specifications, applications and dimensional data. Trumbull Electric Manufacturing Co.

LAMP GUARDS

22. A folder illustrating and describing the Wilson screwless shock proof fibre lamp guards. Safeguard Electric Company, Inc.

COMPRESSORS

23. A 56-page catalog on electric-driven, direct-connected compressors, built to run at moderate speeds for continuous heavy-duty service. Sizes range from 200 to 3000 h.p. for single and multi-stage compression of air or gas to discharge pressures up to 5000 lbs. per sq. in. Many illustrations included. Ingersoll-Rand Co.

WIRE MANUAL

24. "U.S. Royal Cords and Cables" is the title of an illustrated wire manual designed to provide electrical engineers, contractors, purchasing agents, with wire and cable data and specifications. United States Rubber Products.

MOTOR-STARTING CAPACITORS

25. A wall chart listing the required capacitor for any standard type of capacity-starting motor. Different types of motors are alphabetically listed. Aero-vox Corporation.

LIGHTING EQUIPMENT

26. A catalog describing fixtures utilizing both mercury vapor and mazda lamps. It also gives spacing and mounting

heights, foot candle intensities, along with general data covering the mercury lamp. The Miller Company.

AUTOMATIC CONTROLS

27. Catalog Number 100-F features automatic controls for heating, air conditioning, refrigeration and various industrial applications. Covers description, illustration and list price. The Mercoid Corp.

HARDNESS TESTER

28. A small folder featuring the portable Brinell meter. The principle of operation is described. Also includes prices. Louis C. Eitzen Co.

CONNECTOR

29. Bulletin No. 5022 features the Burndy Scrulug. A number of specific applications of the connector are described and illustrated and technical data is given. Burndy Engineering Co., Inc.

ATTIC VENTILATION

30. A folder entitled "Home Cooling by Attic Ventilation." Describes and illustrates the unit. Lists detailed data and net prices. Chelsea Fan & Blower Co., Inc.

DRIVE SELECTOR

31. A 12-page publication entitled "Electric Drive Selector and Hints on Maintenance." Arranged for the non-technical man or plant maintenance man, it describes and illustrates requirements which must be met in selecting a motor. Ten hints on preventative maintenance are discussed. Westinghouse Electric & Manufacturing Co.

INSTRUMENTS FOR MOTOR TESTING

32. A folder, GES-1092B, features data on how to select portable electric instruments for motor testing. Information on voltmeters, ammeters, wattmeters and combinations. General Electric Co.

AIR CIRCULATOR

33. A folder describing the Cool-Circle-Ator table, a device for drawing in cool air and recirculating it around the room. For domestic and commercial use. Illustrations included. Kisco Company, Inc.

CIRCUIT BREAKER PANELBOARDS

34. Bulletin 164 featuring circuit breaker panelboards. Includes il-

lustrations, and application, construction and details. Trumbull Electric Manufacturing Co.

AUTOMATIC TIME SWITCH

35. A folder on M-L synchronous self-starting, self-oiling electric time switch and M-L hand-wound, eight-day automatic time switch. The M-L Time Switch Div. of Diebold Safe & Lock Co.

LATHE CATALOG

36. General catalog No. 97 illustrating and describing in 72 pages, the entire line of back-gear, screw-cutting, metal working precision lathes. South Bend Lathe Works.

INDUSTRIAL LIGHTING

37. A folder describing the construction and application of the Millite lighting unit for heavy industries. Various tests illustrating the ability of the unit to withstand abuse are included. A table of mounting heights, spacing and resulting footcandle intensities, also application data. Westinghouse Electric & Manufacturing Co.

SEPARATOR MAGNETS

38. A new edition of Bulletin No. 910 describing separator magnets. In addition to large diameter circular magnets, it now lists information on smaller circular magnets, rectangular magnets and special magnets suitable for removal of tramp iron from conveyor systems. Also recommendations for various sizes and dimensions. The Electric Controller & Mfg. Co.

WIRE & INSULATING MATERIALS

39. Catalog A consisting of 72 pages of descriptions and listings of insulating paper, pressboards, mica products, varnished cambric, varnished tape, cotton tape, varnish, fibre, bakelite, cotton sleeving, varnished tubing, commutators and miscellaneous supplies for motor repair work. Insulation, Inc.

RECTIFIER POWER UNITS

40. A pamphlet describing B-L heavy duty copper sulphide-magnesium rectifier power units for use in industrial fields. Lists applications, automatic features and power requirements. The B-L Electric Mfg. Co.

PYRANOL CAPACITORS

41. Catalog GEA-2746 illustrating and describing pyranol capacitors for distribution systems. Some of the subjects covered are—reactive KVA on power systems; the capacitor as an aid on the distribution feeder; how to apply capacitors to distribution feeders; operating problems with shunt capacitors and distribution pole-type capacitors. Many charts and diagrams included. General Electric Co.

PRECISION LATHES

42. Catalog No. 46 features the 9-inch "Workshop" precision lathes of all types—with horizontal motor, counter-shaft drive, underneath motor, twelve-speed, pedestal motor, oil pan, back-gear. Many illustrations. South Bend Lathe Works.

COMMERCIAL LIGHTING

43. Three new folders on commercial lighting luminaires entitled "The New Motif in Totally Indirect Illumination for Commercial Establishments"; "Silvurn Conditioned Lighting" and "Vanguard of Commercial Lighting Progress." They list applications for each unit, construction features and foot candle intensities for various mounting heights and spacing. Westinghouse Electric & Manufacturing Co.

(Continued on page 121)

CIRCLE NUMBERS-SIGN-AND MAIL

ELECTRICAL CONTRACTING

March

(Not good after May 1)

Please send me, without obligation, manufacturers' literature herein described and identified by numbers circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32		
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47		
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62		
63	64															

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

CITY..... STATE.....

COMPRESSORS AND PUMPS

44. Bulletin No. 2118 on small industrial compressors and vacuum pumps. Features their "Type 30" line, which ranges in size from 1/4 to 15 horsepower. Includes rating tables of more than fifty models. Ingersoll-Rand Co.

NUMERAL PRINT RECORD

45. Folder No. 84-9 entitled "Legibility plus Precision" reproduces the colored numeral records, exactly as they are printed on the chart of the potentiometer pyrometer recorders. The Brown Instrument Co.

REPLACEMENT LISTING

46. Clarostat servicing data shows the makes and types of sets served, the function and list price of some twelve hundred exact-duplicate controls numerically listed. Of value to jobber, dealer and serviceman. Clarostat Mfg. Co.

ELECTRIC DRILL

47. A pamphlet illustrating and describing "the smallest and lightest 1/2-inch electric drill in the world," known as Thor U44. Independent Pneumatic Tool Co.

MERCURY LIGHTING

48. A folder illustrating applications of high intensity mercury vapor lighting in industrial plants. Includes complete line of equipment and accessories for both mercury and combination mercury-incandescent units. Westinghouse Electric & Manufacturing Co.

ANTI-VIBRATION PRODUCTS

49. A Marine bulletin entitled "Smoother Sailing with Korfund." Illustrates and describes the vibro-dampers and Type T seismo-dampers, with technical data on each. The Korfund Co., Inc.

ELECTRICAL CONSTRUCTION MATERIALS

50. A catalog of 74 pages of interest to those who plan, specify, install or use electrical construction materials. It covers underfloor distribution systems, rigid and flexible steel conduit, armored and non-metallic cable, rubber covered building wire, flexible and portable cords and special purpose wires and cables. Walker Brothers.

WIRE CONNECTORS

51. A folder describing solderless, tapeless wire connectors. Features standard universal, fixture, large universal and fixture appliance types. Ideal Commutator Dresser Co.

TRANSFORMERS

52. Bulletin No. S-501 covering current and potential transformers for outdoor and indoor use, built to AIEE and NEMA specifications. Standard Transformer Co.

SIGNALING SYSTEMS & DEVICES

53. Catalog No. 16 comprises bulletins on bell, buzzers, horns and chimes; annunciators; bell ringing and signaling transformers; push buttons; hold-up alarm systems and devices; relays and wiring accessories; fire alarm equipment; inter-communicating telephones; door openers and apartment house telephones, mail boxes and bell systems. Auth Electrical Specialty Company, Inc.

CODE

54. A pictorial presentation of the 1937 National Electrical Code for the convenience of inspectors and electrical contractors. Consists of a series of charts including a cross index reference of 22 commonly encountered topics, keyed to a typical schematic system of interior wiring. The booklet is arranged so that a copy of the code itself, can be pasted within the covers. General Electric Co.

CONTROLLING AND DISTRIBUTION APPARATUS

55. January edition of the Bulldog condensed catalog. Issued periodically. Covers safety switches, service equipment, lighting and distribution panels, duct and fittings, circuit breakers. Bulldog Electric Products Co.

MOTORS

56. A folder, Form 1066, on automatic start induction polyphase motors. Gives illustrations and description. Century Electric Co.

DIMMER

57. Bulletin 76 features the Autrastat dimmers for a.c. circuits. Illustrations, diagrams and list prices included. Ward Leonard Electric Co.

AUTOMATIC CONTROLS

58. A brochure and folder outlines the features and function of Selectron automatic controls. Selectron Company, Inc.

WELDING CONTROL

59. A 12-page pamphlet entitled "New Profits from Resistance Welding with Ignition Split-Second Control." Includes installation pictures and suggestions for handling unusual welding jobs, needing frequent heat adjustment. Westinghouse Electric & Manufacturing Co.

AIR CONDITIONER

60. A bulletin describing "Vitalaire," a portable air conditioner for home or office use. Lowell Air Conditioning Corp.

HEAVY DUTY PUSHBUTTONS

61. A new publication describing a line of push buttons for heavy duty service on a.c. and d.c. pilot circuits. Westinghouse Electric & Manufacturing Co.

SWITCHBOARDS

62. A folder on "Swing-Wa" dead-front switchboards for power and light distribution. Illustrations and diagrams included. Trumbull Electric Manufacturing Co.

RELAYS

63. Bulletin 251 covering sensitive relays for direct and alternating current. Gives ratings, sensitivity, dimensions and price list. Ward Leonard Electric Co.

INSTRUMENTS

64. A folder describing the new model "DM" Megohmer. It differs from the older instruments in that it has been redesigned to be used also as a portable a.c. and d.c. voltmeter with a range of 600 volts. Herman H. Sticht & Company.

It takes all the bends with the greatest of ease

SCOTT TAPERED FISHWIRE

Which always will please!

(apologies to a well-known song)

Here is the first and only improvement in **FISHWIRE** ever offered the electrical industry. **EXTREME FLEXIBILITY** of patented tapered end permits easy passing around all bends, with no wedging. 1/8, 3/16, and 1/4 x .060, in 50, 75, 100, 150 and 200 foot coils. A great time, trouble and money-saver.

1. Ordinary fishwire. Lack of flexibility prevents easy pushing through.

2. Extreme flexibility and tapered ends lead Scott Fishwire around all bends with ease.



THE RATTAN MANUFACTURING CO.

552 STATE STREET

NEW HAVEN, CONN., U. S. A.

GENERAL SALES AGENTS HATHEWAY AND CO.
220 CHURCH STREET NEW YORK, N. Y., U. S. A.

MINERALLAC HANGER



Conduit 3/8"—2 1/2"

Cable to 2 1/8" (with Bushings)

MINERALLAC JIFFY CLIP



Sizes from .250" O.D. Tubing
to 1 1/4" conduit.

See your Jobber

New York City Office
Theodore B. Dally
50 Church Street

MINERALLAC ELECTRIC CO.
25 N. Peoria St., CHICAGO

WITH THE

Manufacturers

Charles W. Stone Dies

Charles Waterman Stone, consulting engineer of the General Electric Company, died at his home in Schenectady, February 3, after an illness of nine weeks. He was 63 years old. He had been with the General Electric Company for the past 37 years.

H. G. Hafner & Co., representing the McGill Manufacturing Company of Valparaiso, Ind., moved its office and warehouse on January 1 to 40 S. Clinton Street, Chicago.

Joseph Libbon has been appointed assistant sales manager of the Greist Manufacturing Co., New Haven, Conn. He will be associated with Charles A. Baratelli, newly created director of sales for this organization.

Fixture Association Organized

The National Lighting Fixture Guild was recently organized at a meeting of fixture dealers and jobbers in the Pennsylvania Hotel, New York City.

The objectives of the Guild include among other things, public education on adequacy to assure efficient lighting, the decorative values of properly designed fixtures, and to increase the demand for ceiling fixtures and wall brackets. Efforts will be made to eliminate varied trade practices that have proved harmful to the industry.

The following officers were elected: president, A. L. Oppenheimer, Enterprise Electric Lighting Fixtures, Inc., Cleveland; vice president, John Donovan, Service Electric Manufacturing Co., Boston; vice president, Harold B. Carpenter, Whiffen Electric Co., White Plains, N. Y.; secretary, W. Henry Dowdy, Dowdy Electric Co., Roanoke, Va.; treasurer, Morris Sklar, Morris Sklar Company, Philadelphia. George E. Henry has been appointed business secretary of the group, with headquarters in the International Bldg., 630 Fifth Avenue, New York City. Annual dues were voted at \$25 per membership by the 35 dealers and jobbers present, initiation fee being waived for the time being.

Triangle Conduit & Cable Co., Inc. of New York announces that on and after February 1, the New York State territory north of Poughkeepsie, including Sayre, Erie, Warren and Bradford in Pennsylvania will be under the supervision of J. J. Slater, New England District Manager. Mr. Slater's headquarters are at 15 Hathaway Street, Boston, Mass. Dick Savage has been added to Slater's sales organization and will devote the principal part of his time to covering this additional territory.

George H. L. Norman has been appointed chief engineer of Aerovox Canada, Limited of Hamilton, Ontario.

Graybar Electric Company recently opened its 84th house in Springfield, Mass. E. R. Howe, who since 1936 has covered the Springfield and western Massachusetts territory, is now resident salesman in charge of the Springfield branch. He is assisted by H. O. Edoff, now salesman at Springfield, and James D. Roche, service supervisor.

O.Z. Electrical Manufacturing Company of Brooklyn, recently moved into its new factory at 262-266 Bond Street.

Westinghouse Promotions

Three executives associated with the industrial sales department of the Westinghouse Electric & Manufacturing Company have been promoted to new positions—

O. F. Stroman, since 1931 manager of this department, has been appointed assistant to the vice-president in charge of sales.

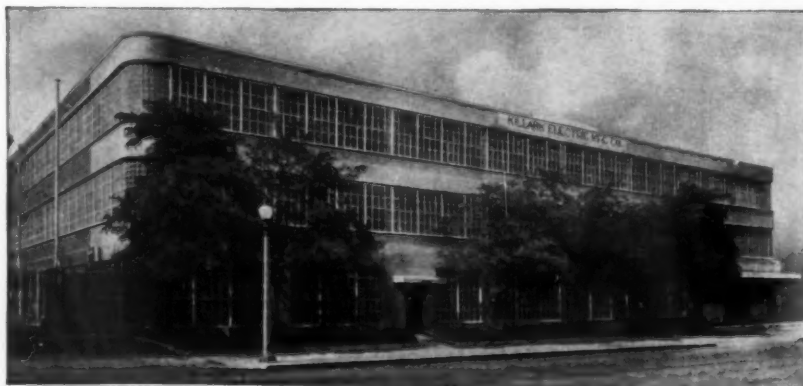
C. B. Stainback, formerly assistant manager, becomes manager. Bernard Lester, also a former assistant manager, has been made manager of a newly created resale department.

James Boyd, formerly assistant eastern district manager, has been appointed eastern district manager. He succeeds H. F. Boe, who has become commercial manager of the company, with offices in Pittsburgh. Mr. Boyd's headquarters will be in New York, at 150 Broadway.

Allis-Chalmers Manufacturing Company's Publicity Department for power, electrical and industrial machinery now has two sections. George Callos has been appointed assistant manager in charge of sales promotion. A. K. Birch has been made assistant manager, in charge of market analysis and sales organization service.

Sola Electric Company of Chicago, has appointed the Marsh Sales Agency, 1479 West Adams Blvd., Los Angeles, as its representative in southern California and Frank D. Fagan Co., 555 Howard St., San Francisco as its representative in Northern California.

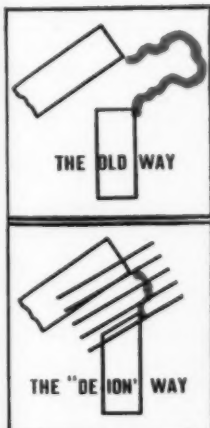
E. L. Wyman, executive vice president of Clayton Mark & Co. of Chicago is now supervising conduit sales, formerly handled by D. W. Droll. Mr. Droll has moved to New York to become associated with the Wheeling Steel Corporation.



NEW KILLARK FACTORY—This new modern building, with glass brick and other fancy features is now the home of Killark Electric Manufacturing Company in St. Louis. It occupies the site of this company's original building, but it provides three times the floor space that they had before.

NO MORE BEADED
CONTACTS JOE! WITH
THOSE DIAMOND
POINTED JAWS AND
"DE-ION" GRIDS

YEP, AND THAT
ONE-PIECE COPPER
KEEPS 'EM AS
COOL AS A
CUCUMBER, TOO



"DE-ION" GRIDS QUENCH DESTRUCTIVE ARCS

You won't be bothered with customer complaints about flash-overs and burned contacts when you install Westinghouse Safety Switches with "De-ion" arc quenchers. The "De-ion" feature on all Westinghouse 575 and 600-volt switches gives positive protection by quenching arcs so fast that they can do no damage.

And years of trouble-free service are assured by these added Westinghouse features: Diamond pointed jaws and extended blades confine beading to points outside the contact areas — one-piece copper parts eliminate loose connections and keep contacts cool and tight.

Simplicity of construction makes Westinghouse Safety Switches easy to install. Parts completely visible, for easy inspection.

All commercial types and ratings available from your electrical wholesaler.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURGH, PA.

In the past, arcs have been broken by "stretching." The "De-ion" quencher confines, divides and extinguishes arcs instantly — obviously preventing concentration of burning heat on contacts or arc barriers.

J-20517-A



Westinghouse Safety Switches

MOTORS • CONTROL • CIRCUIT BREAKERS • SAFETY SWITCHES • PUSH BUTTONS

Every phase of electrical maintenance and repair work covered in this *new* Library

**5 volumes
of practical
how-to-do-it
information**



Every man concerned with the care and repair of electrical machinery should have these practical books, with their helpful tables, diagrams, data, methods and kinks. Every one of the five volumes is jammed to the covers with sound, how-to-do-it information—the kind you have to have when anything goes wrong. Liberal use has been made of practical data and practice in repair shops so as to combine the good features of a library of methods with handbook information covering these methods.

Electrical Maintenance and Repair Library

5 volumes—2042 pages—1721 illustrations

IN these books will be found answers to practically all the repair and winding problems that the electrician will meet in actual practice. The books discuss direct and alternating current windings—repair shop methods for rewinding armatures—commutator connection—the testing of armature windings—the testing of induction motors for faults—practical ways of reconnecting induction motors—commutator repairs—correct brush troubles, etc.

They tell you how to inspect and repair motor starters and generators—how to diagnose motor and generator troubles—how to figure new windings for old cores on induction motors.

You learn about three-wire systems, starting rheostats, transformers and starting polyphase motors, etc.

They give you scores of practical methods used by electrical repairmen to solve special problems.

New trouble-shooting and repair book now included in Library

Now, in addition to four well-known practical books on all details of testing, connecting, rewinding, installing and maintaining electrical machinery, the Library of Electrical Maintenance and Repair includes Stafford's *Troubles of Electrical Equipment*, a new book full of helpful maintenance information special trouble-shooting charts, explanation of symptoms and causes of machinery troubles, specific remedies, etc. This revised library helps you to know the why as well as the how of electrical maintenance and repair work, gives you the ability to handle bigger jobs with surety of results.

10 Days' Free Examination—Easy Monthly Payments

You can secure the use of these five great books on electrical repair work for *ten days' free examination*. When you have seen for yourself what these books are and how much they can help you, send us your first remittance. The balance may be paid in monthly installments of \$2.00 until the price of the library is paid. Send for the books today. Fill in and mail the Free Examination Coupon.

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Send me the Electrical Maintenance and Repair Library (5 vols.), postpaid, for 10 days' free examination. Within 10 days of receipt I will send \$1.00, and \$2.00 monthly until \$15.00 is paid, or return the books postpaid.

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(Books sent on approval in U. S. and Canada only.)

WITH THE
Manufacturers

[FROM PAGE 122]

General Electric News

The G-E wiring materials field organization has been divided into six national sales districts, according to an announcement by J. H. Crawford, manager of the company's construction materials division at Bridgeport, Conn.—

L. F. Giblin, wiring materials field supervisor, has been assigned to special duties and studies of distribution problems. District managers named under the new plan and their headquarters are E. G. Hall, Boston; F. D. Bedell, New York; R. R. Morgan, Dallas; L. F. Kummel, Cleveland; J. P. McIlhenny, Chicago; J. O. Dillingham, San Francisco.

D. W. McLanagan, assistant commercial engineer of the G-E air conditioning department, has been named manager of the General Electric Air Conditioning Institute. R. D. Wood will assist Mr. McLanagan with the institute activities, located at Bloomfield, N. J.

Fairbanks, Morse & Co. has moved its general offices to the modernized F-M building at 600 S. Michigan Ave., Chicago.

Thermador Electrical Manufacturing Co. of Los Angeles, Calif., has announced the appointment of Robert O. Webster as district manager of the Sacramento and Stockton territory, with headquarters in Sacramento.

Frank Collins also has been named as northwest representative with headquarters in Portland, Oregon.

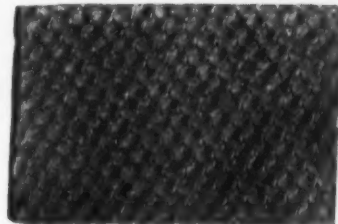
Ewart C. Hugh, formerly associated with the General Electric Vapor Lamp Company, has been appointed vice president in charge of sales of the commercial lighting division of Bar-kon-Frink Tube Lighting Corp., Long Island City, N. Y.

Change in Name and Personnel

The Standard Electric Stove Company of Toledo, Ohio, has changed its name to the Standard Electric Manufacturing Corporation.

Joseph W. Robinson, formerly president of the Libbey Glass Company, has been elected president of the new Standard corporation. Charles A. Pierson, president of the former Standard Company, has been named vice president in charge of manufacturing operations and research. Harry H. Venable, has been made advertising and sales manager. Ellsworth L. Tait, former assistant treasurer of the Libbey Glass Co., has been appointed treasurer.

BROWN TAPE— the natural color of RAW RUBBER...



Above is an actual photograph of a piece of raw rubber as it comes directly from the sap of the rubber tree. To give it higher tensile strength and toughness, this rubber is smoked at the plantation. These smoked sheets of raw rubber are shipped to Plymouth in their natural brown color.



"SLIPKNOT BROWN" introduces a brand new era in friction tape. It's different—it's better—because it's the natural color of raw rubber smoked sheets. Fresh, pure rubber, right from the tree, comes direct to Plymouth and is worked into the fabric. The high content of this raw, brown rubber in this new tape assures additional strength and lasting adhesive qualities.

"SLIPKNOT BROWN" is the first real development in tape in a generation. It wasn't made over night — years of painstaking research stand behind the finished product.

Be the first in your community to use this new, modern, and better tape. On your next job, do it up brown!

PLYMOUTH RUBBER COMPANY, Inc.
CANTON, MASS.

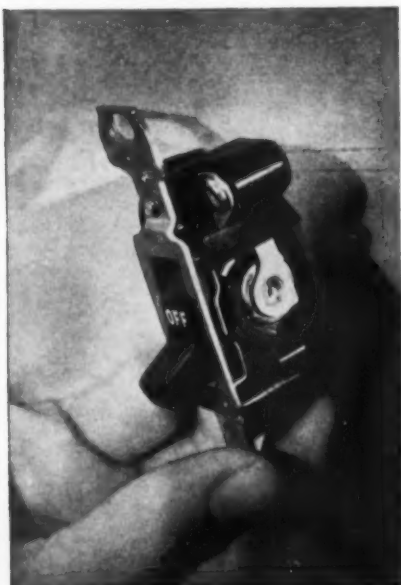


Write for a sample of this new tape
BUY FROM YOUR WHOLESALE

EQUIPMENT *News*

Silent Switch

A new silent switch has been developed in which the contact is made and broken by the movement of mercury. Small and compact, there are no springs that can be broken, no blades to hammer away. The actual switching element is the size of a small coat button, composed of two metal disks sealed with glass, completely enclosing the mercury make-and-break of the switch. Large binding screw heads will accommodate number 12 wire. Can be installed in any standard switch box and must be mounted vertically. General Electric Company, Bridgeport, Conn.



GENERAL ELECTRIC MERCURY SWITCH

Tapered Fish Wire

Fish wire developed through experiments in glass conduit to find a way to avoid binding at bends. It resulted in a tapered wire that fishes more easily. Packed in 50, 75, 100, 150 and 200-ft. coils. Rattan Manufacturing Co., New Haven, Conn.



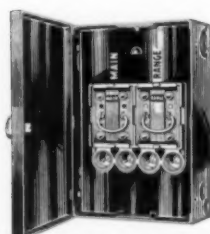
RATTAN FISH WIRE



PASS & SEYMOUR SURFLEX

Surface Wiring System

New thought in surface wiring is presented in a line of Surfex devices just announced for use in armored cable and non-metallic sheath cable systems. All necessary parts for the outlet are combined in a single unit. Separate boxes, connectors, tape and solder are not needed. Surfex units provide porcelain switches, sockets, receptacles, rosettes and junction boxes that tie into the line by simply mounting the device and connecting the wires. Pass & Seymour, Inc., Syracuse, New York.



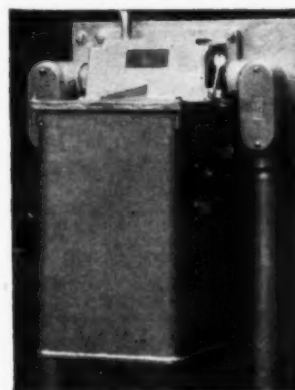
WADSWORTH SERVICE ENTRANCE EQUIPMENT

Service Entrance Equipment

An improved service entrance equipment with range, lighting and water heater circuits. Pull cover type construction, available for surface and flush mounting, with fusible or non-fusible pull cover for main switch unit. Range switch unit available in either 30 or 60 ampere capacity. Reversible cabinet permits mounting so circuits can be brought out, at bottom or at top. Pull covers ventilated and non-interchangeable. Switch contact is made outside of well. Wadsworth Electric Mfg. Co., Inc., Covington, Ky.

Oil Immersed Linestarters

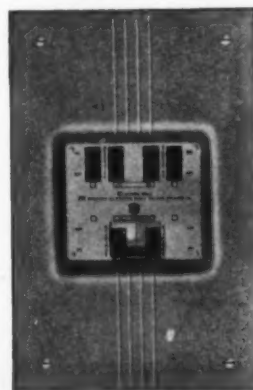
Totally oil immersed linestarters known as low voltage type DNO, explosion-proof and corrosion resisting service, are designed for starting squirrel cage motors in oil refineries, chemical plants, paper mills, coke plants, cement mills and in similar applications where either corrosive or explosive gases may be present. Combination starters provide, in one oil tank, complete corrosion-resisting motor control, motor disconnect switch and circuit protective device. Explosion-proof starters conform to specifications for apparatus for installation in Class I, Group D, hazardous locations. Linestarters designed for wall or frame mounting, with tapped holes for conduits on top. Overload protection is provided. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.



WESTINGHOUSE COMBINATION LINESTARTERS

Load Centers

Nofuse multi-breaker load centers developed for use in homes, apartments and small commercial establishments. Wiring system is protected at all times, because breaker handles cannot be held closed against a continued short circuit or dangerous overload in the system. Can be installed in kitchen, hallway or other convenient location. Approved by the Underwriters' Laboratories, Inc. Shipped complete ready for wiring. The Bryant Electric Company, Bridgeport, Conn.



BRYANT NOFUSE LOAD CENTER

YOU CAN SAVE

time and money

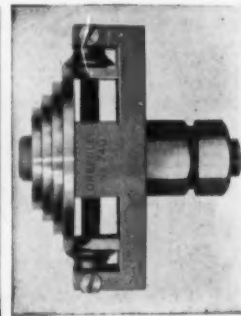
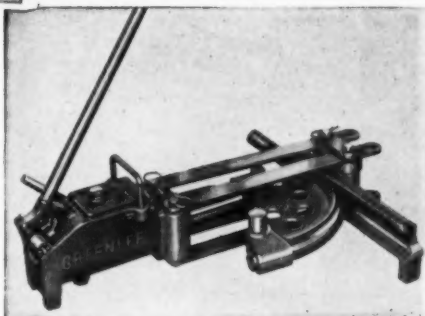
WITH GREENLEE TOOLS

CONDUIT BENDERS • KNOCKOUT TOOLS • PIPE PUSHERS • BORING TOOLS



Hydraulic Benders

Above is shown the Greenlee Rigid Conduit Bender in action. Note how the conduit is held at two points by formed castings while it is being bent by forcing a formed shoe against it by hydraulic pressure. It is readily portable and simple to operate. Bends made with it are smooth and accurate. No. 770 bends all sizes from 1/4" to 3". The large bender, No. 775, handles all sizes from 2 1/2" to 4 1/2". The No. 770-T Thin-Wall Steel Conduit Bender is shown to the right. Same as No. 770 but with attachments for 1/4", 1/2" and 2-inch thin-wall conduit.

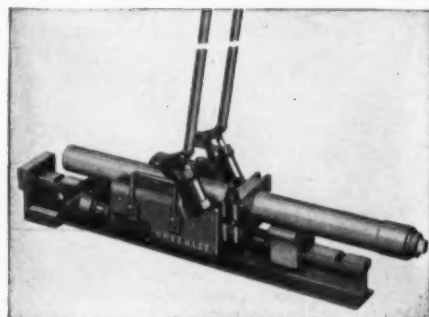


Boring Tools

For boring holes at high speed, the Greenlee No. 31 Electricians' Bit is recommended. Known as the fastest boring tool on the market, it has a double-spur head for long life and a coarse screw point for fast feed.

When a long reach is needed, the Greenlee Bit Extension is the ideal tool. No. 900 will drive bits up to 1" and follow a 5/8".

Ask about the Greenlee Ball-Bearing Joist Borer. It is an unusually efficient tool capable of driving bits up to 1 1/4".



Knockout Tools

Hole in outlet boxes, switch cabinets, etc., can be enlarged quickly and accurately with the Greenlee Knockout Tools shown above. Smooth holes are the result, without reaming or filing. Punches come in two sets and are provided with leather cases. No. 735 is for 1/2", 3/4" and 1 1/4" conduit, while the No. 737 will enlarge holes for 1 1/2" and 2" conduit. The No. 740 Cutter will enlarge holes for 1 1/2", 2, 2 1/2" and 3" conduit. It is also provided with a case.

Hydraulic Pipe Pusher

The Greenlee Hydraulic Pusher is an improved tool for the underground installation of pipe for any purpose. One man can stand in a comfortable position and send pipe where it is wanted, simply by pumping the handles. Capacity for pipe up to 4".

..... Mail This Coupon To-day

GREENLEE TOOL CO., ROCKFORD, ILL.

Please send information on the following tools:

<input type="checkbox"/> Rigid Conduit Benders	<input type="checkbox"/> Thin-Wall Conduit Benders	<input type="checkbox"/> Pipe Pushers
<input type="checkbox"/> Knockout Tools	<input type="checkbox"/> Joist Borers	<input type="checkbox"/> Electricians' Bits
<input type="checkbox"/> Bit Extensions		

Name Address

City State

My Jobber is EC3-38

GREENLEE TOOL CO., ROCKFORD, ILLINOIS

LISTED BY
**UNDERWRITERS'
LABORATORIES, INC.**

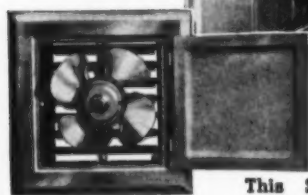
KENT LOUVERED RECESSED LIGHTING FIXTURES

The safe, approved recessed lighting line. Made in round, oblong and square shapes and to specifications. ASK YOUR WHOLESALE OR WRITE FOR NEW CATALOG.



KENT
METAL MANUFACTURING CO.
20-22 Morton St. Brooklyn, N. Y.

A KITCHEN *Necessity* in EVERY HOME



This Signal Automatic Wall Box Kitchen Vent Fan is easy to install, and adjustable to wall thickness . . . removes cooking odors, steam, smoke, and excess heat . . . operates quickly and quietly . . . available for A. C. or D. C. current; A. C. type is non-radio interfering . . . 10" quiet-type fan, cast aluminum frame. List price \$32.00. We will gladly send you complete information upon request.

SIGNAL ELECTRIC MFG. CO.
Menominee, Michigan
Offices in all principal cities

SIGNAL

EQUIPMENT *News*

[FROM PAGE 126]

Brown Tape

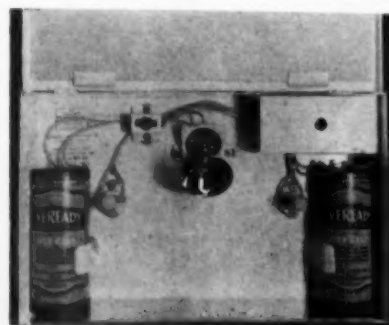
An innovation in tape is announced, the change being that it is brown in color—the shade of the raw rubber, which is used as the base. It is presented by the manufacturer as the first basic improvement in tape in many years, because it is claimed that the brown rubber will give long life. Plymouth Rubber Company, Inc., Canton, Mass.



PLYMOUTH RUBBER SLIPKNOT BROWN

Emergency Light

The Hulst dual exit-light is an emergency light system designed to provide light for exit doors, both with normal 110-volt, a.c. or d.c. service and on failure of that service. Unit is housed in a cabinet and normal lighting is effected by two bulbs connected in parallel and controlled by an external switch. Second plug-in is connected to a permanent live circuit, which holds open battery circuit through a relay. When current fails, the emergency lamp in center of unit lights and sends out direct and reflected light through clear glass opening in center of red glass panel. Emergency Light Corporation, 23 Washington St., New York, N. Y.

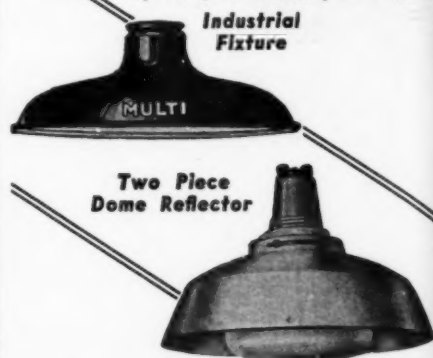


EMERGENCY LIGHT CORP. UNIT

**MORE BUSINESS . . .
... BETTER JOBS
WITH**

MULTI REFLECTORS

There is profitable business everywhere for contractors who make satisfied customers by installing Multi Reflectors. They make possible better lighting for factories, offices, assembly halls, schoolrooms, and homes.



Multi Reflectors are porcelain enameled—will not crack nor chip from vibration or expansion—rustproof—easily cleaned—made in hundreds of types and sizes. Do the job better with Multis. Our complete catalog is yours for the asking.

MULTI-ELECTRICAL MFG. CO.
1840 W. 14th Street, Chicago

SHERMAN SET SCREW CONNECTORS

A COMPLETE LINE



★Made in 14 sizes for stranded or solid wire. Dimensions and proportions held to accurate size. Made of solid brass by the well-known Sherman Precision Method.

Each size plainly marked for easy stock keeping and reordering.

Send for Bulletin No. 8.

H. B. SHERMAN MFG. CO.
Battle Creek, Mich.



Buried alive-- yet fixed for life

★That's what happens to wire that finds a home in Buckeye Conduit.

No rough or flaked lining will chafe its insulation. No flats on the inside of an elbow will pinch the wire. The grounded circuit will be continuous because Buckeye threads are always clean, for a perfect fit.

From the ore in the earth to the finished material, Youngstown manufacturing control is positive and precise. Buckeye Conduit is the only conduit in America made complete by one organization. That close supervision is your best assurance of an always-satisfactory, absolutely-uniform product.

Buy Youngstown Buckeye Conduit and you'll save time with faster coupling and less resetting of bends, hence you'll make more profit on every job.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices

YOUNGSTOWN, OHIO

Conduit • Pipe
and Tubular Pro-
ducts • Sheets • Plates
Tin Plate • Bars • Rods
Wire • Nails • Unions
Tie Plates and Spikes

26-4A

YOUNGSTOWN

TIME SWITCHES

Automatic Synchronous Time Switches are equipped with self-starting motors. They are always in demand because of their accuracy and dependability. Simple design and construction make possible a high quality product at minimum cost. Capacities from 5 to 400 amperes. Priced from \$4.95.

FLASHERS

These Automatic Induction-disc Motor-driven Flashers are indispensable because of low cost, durability, and dependability. We can supply Flashers for every effect from the simple ON and OFF to the most spectacular displays — one circuit — alternate — combinations — color change — spellers — chasers — relays. Priced as low as \$6.50.

WRITE FOR MORE DETAILED INFORMATION.

AUTOMATIC ELECTRIC MFG. CO.
MANKATO - - - MINNESOTA



**SEND FOR YOUR
COPY OF FULL SIZE
REPRODUCTION AND
DESCRIPTION OF
TRIPLE COLOR GRADING
SCALE MEGOHMER**

It grades insulation as "Good," "Fair" and "Doubtful."

Use coupon.

HERMAN H. STICHT & CO.
Dept. 53, 27 Park Pl., New York

Send Full Size copy of Megohmer with triple color scale. ☐

Name

Firm

Address

EQUIPMENT News

[FROM PAGE 128]

Luminaire

This 200-300-watt Commadore luminaire has been added to the Commadore line of plaskon units. It is supplied in satin aluminum finish and equipped with a 15½-in. plaskon reflector. Complete plaskon units now available in the miniature size—the smallest unit takes only 60 watt lamp. These units are being used in miniature classrooms and store installations to demonstrate contrast between poor and good lighting. F. W. Wakefield Brass Company, Vermilion, Ohio.



WAKEFIELD COMMADORE LUMINAIRE

Intercommunication System

An intercommunication system, known as the "Handy-Phone", is designed for use in offices, hospitals, stores, homes or any similar place where voice communication is desired. Consists of one master station and from one to four remote speaker-phone stations. An individual at the master station may have two-way conversations with any of the remote stations or may speak to all of them at one time. Remote stations may talk back to the master station without operator using hands, switches or keys. Operating cost of system is approximately a quarter of a cent per hour. Operates on either a.c. or d.c., 115-125 volts; 24, 50 or 60 cycles. General Electric Company, Bridgeport, Conn.



G-E "HANDY-PHONE"



ILSCO

SOLDERLESS CONNECTOR



**NO SPECIAL TOOLS
REQUIRED TO
MAKE CONNECTION**

ILSCO solderless connectors eliminate need for special tools, thereby providing faster, permanent connections. Other ILSCO features:

NO set-screw contact . . .
NO flattening or separating of stranded wires
NO limitation to one size wire . . .
NO shearing effect whatsoever . . .

NO need for you to search any longer for the PERFECT Solderless Connector . . . WE HAVE IT! Six Sizes Take Care of All Wires from No. 14 to 1,000,000 C.M.

FREE—A large display board bearing mounted samples of ILSCO lugs. Address Dept. EC

ILSCO COPPER TUBE & PRODUCTS, INC.
5629 Madison Road, Cincinnati, Ohio

HERWIG

OUT-DOOR LIGHTING FIXTURES

Apartment Buildings
Public Buildings
Bungalows
Churches
Schools
Garages
Country Clubs
Warehouses
Residences

**A FIXTURE FOR EVERY
OUTDOOR PURPOSE**

Cast Iron or Bronze

Send for our

Catalogue No. 40

200 Illustrations

The
Herwig Company

MANUFACTURERS
Established 1908

1753-59 Sedgwick Street
Chicago, Illinois, U. S. A.

Modern Numbers Shown on P. 4 & 5
—Also Furnished in Cast Aluminum
—Polished or Satin Finish



**I COOL AND SOOTHE
HOT WEATHER NERVES!**
... quickly ... quietly!

GENERAL ELECTRIC
Super-Quiet Fans



NEW FANS! NEW PLANS!

Here is the big fan news of 1938 . . . the amazing new General Electric Super-Quiet Fans, equipped with revolutionary, new G-E Vortalex Blades!

These blades provide greater air movement and quieter operation—because they are scientifically shaped and pitched so that every bit of blade surface works with maximum efficiency! And they are an exclusive G-E development!

Tie in with G-E FANS for 1938 and participate in the profits that General Electric Fan Dealers will enjoy! You'll have four lines of fans—Super-Quiet, Quiet, Standard and Junior—a line to meet every demand—and brilliant new sales and advertising helps featuring a brand new "HOT WEATHER NERVES" consumer approach!

Ask your General Electric Fan Distributor's Salesman for complete details. You'll profit by it!

THE NEW 1938 G-E FAN PORTFOLIO

Contains complete details concerning General Electric's new fans and new plans for 1938. The salesman of your local G-E Fan Distributor has a copy. Ask to see it! Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL  ELECTRIC

VICTOR IN-BILT VENTILATORS



**SEND TODAY
For Your Free Copy of
this Ventilation Catalog**

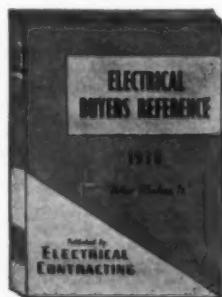
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800 Reading Road Cincinnati, Ohio

QUESTION

?

You'll find the answer
to thousands of questions
about electrical products
in



EQUIPMENT *News*

[FROM PAGE 130]

Control Stations

A new line of Allen-Bradley Bulletin 800, heavy-duty push-button control stations has been developed for surface and flush mounting. These units have a maximum d.c. rating of 2.5 amperes, 115-volts; 1.25 amperes, 230-volts; 0.25 amperes, 550-volts. Maximum d.c. rating: 10 amperes, 110-220-440-550 volts. Push-button type can be mounted in combinations of one to ten buttons. Flush mounting stations available in combinations of one to five units. Suitable for machine tool applications. Allen-Bradley Company, 1311 S. First St., Milwaukee, Wis.



ALLEN-BRADLEY CONTROL STATIONS



DICTOGRAPH DOORMASTER

Crime Prevention System

The Dictograph Doormaster is a communication system designed to prevent crimes committed in home when housewives, servants or children open the front or back doors to strangers. Unit consists of a combination microphone-loudspeaker in front or back doorjamb and a hand-set or wall-type telephone conveniently located inside the house. A feature of the Doormaster is that it may be installed to provide room to room communication. Dictograph Products Company, Inc., 580 Fifth Ave., New York.

Capacitors

A line of dust tight capacitors has been developed for use in mills and plants with dust laden atmospheres to protect live parts from an accumulation of foreign materials. They consist of three parts; the capacitor unit proper, the dust tight terminal compartment and the mounting supports. Several may be placed side by side, about 1 inch apart, and connected together by means of 1½-in. flexible or rigid conduit, using side knockout holes. Available in 5 and 7½ kva., 230 volt, 60 cycle ratings and 5, 10 and 15 kva., 460 and 575 volt ratings. Designed to meet all standard NEMA and AIEE tests. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.



WESTINGHOUSE CAPACITOR

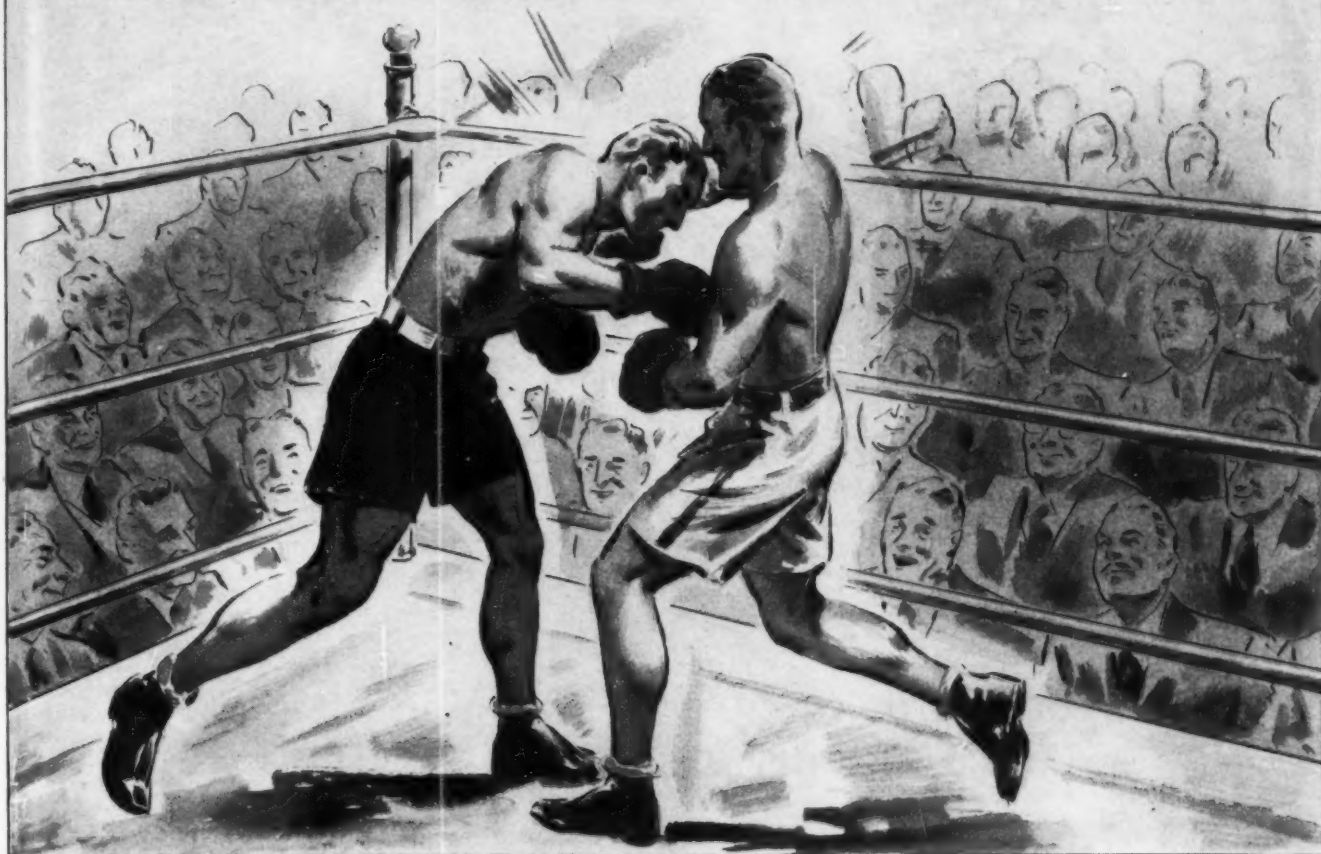


ONAN GENERATOR PLANT

Generator Plant

A compact, gasoline engine driven generator set, 5000 watt capacity, with 25 per cent overload capacity. A 90 degree V type four cylinder engine, 1800 r.p.m. is balanced to eliminate vibration and directly connected to a ball bearing, self exciting 110-volt a.c. generator. Available in three types; manual starting, remotely controlled self-starting and full automatic. D. W. Onan & Sons, 43 Royalston Ave., Minneapolis, Minn.

ARE YOU FIGHTING YOUR WAY OUT OF THE TIGHT SPOTS—



—OR FIGHTING MATERIALS INTO THE JOB? *It amounts to the same*

● Overcoming opposition to materials used on your jobs is an unnecessary and thankless task—and one that can be eliminated easily and satisfactorily by the continued use of **RACO • ALL-STEEL • PRODUCTS**.

A total of more than 40 years of manufacturing experience is behind the switch boxes, outlet boxes, cutout boxes, cabinets, fuse cabs

and conduit fittings which bear the famous **RACO** and **ALL-STEEL** trade-marks. Advanced engineering assures the continuation of their high standards and nationwide acceptance.

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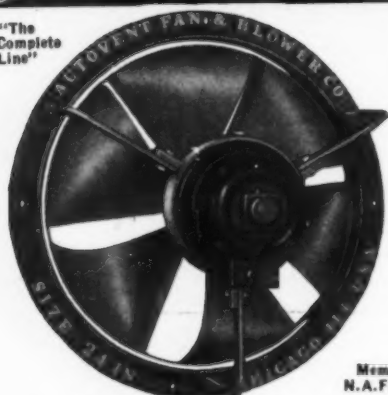
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SWITCH BOXES • OUTLET BOXES • CUTOUT BOXES
CABINETS • FUSE CABS • CONDUIT FITTINGS



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CERTIFIED RATINGS
Install
AUTOVENT
Ventilation

"The
Complete
Line"



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PROPELLER FAN JOBS Bring RICH PROFITS to every contractor!

★Every office and plant requires sufficient propeller fans to provide adequate ventilation. The "BW" or (Bucket Wheel) type pictured above is a popular, slow speed operating unit, particularly designed for efficiency and economy. Check up on manufacturers in your vicinity—learn their ventilation problems—start cashing in on these PROFITABLE PROPELLER FAN JOBS at once! Certified rating. Performance data, specifications, prices, profits on request! Bulletin No. 202.

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812 W. Jackson Blvd., Chicago, Ill.

BUSINESS FOR SALE

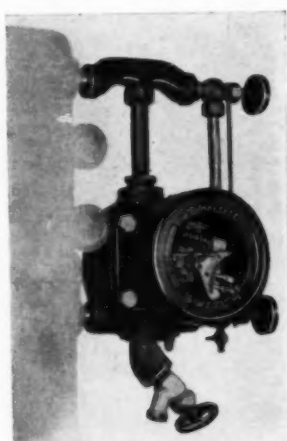
Selling to close estate, remote electrical Hot Water Control, patented, fool-proof automatic shut-off, established 13 years, with sales distribution over entire United States, may be purchased at attractive price. Operates ordinary 30 gallon hot water heater and tank resulting in savings as high as \$7.00 per month by actual test. Easy to sell and install. A positive convenience and saving to every user. Ideal item for Electrical Contractor. A small investment will give excellent returns with big possibilities. Box 301.

EQUIPMENT *News*

[FROM PAGE 132]

Explosion Proof Controls

Explosion proof automatic controls have been developed in several types, for a variety of applications. Pressure controls are available ranging up to 2500 lbs. for use with air, oil, water, steam, ammonia or other chemicals, not injurious to brass or steel. Temperature controls for temperatures from minus 30 degrees to plus 450 degrees F. are manufactured with explosion proof cases. Transformer relays and lever arm and float operating controls can also be encased. The Mercoid Corporation, 4213 Belmont Ave., Chicago, Ill.



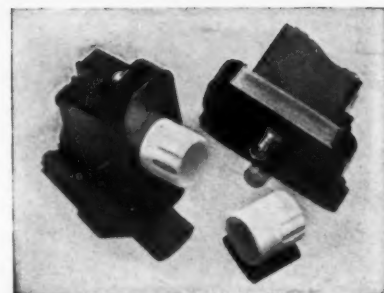
MERCROID CONTROL

Angle Reflectors

Symmetrical angle reflectors designed for use with 250-watt high intensity mercury lamps. Provide illumination where intensive local lighting of vertical and horizontal surfaces from side is required. Reflector, has diffusing glass cover, to give wide distribution of light horizontally and even distribution of light vertically. Acid etched glass cover hinged to reflector bead, supported at three points and released by unsnapping two latches. Water proof felt provides gasket between reflector and lens. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.



WESTINGHOUSE 250-WATT ANGLE REFLECTOR



G-E ILLUMINATED PUSH-BUTTON STATION

Push-Button Station

A small, standard-duty push-button station with an indicating lamp in the center of a translucent button has been developed for machine operators. Requires only one-half the space needed by two devices when they are mounted separately. Available with buttons in six colors: white, green, blue, red, clear, and amber. Indicating lamp is operated through a small control transformer which can be mounted in or on a machine. Size is 2½-in. high, 1½-in. wide and 2½-in. thick. General Electric Company, Schenectady, N. Y.

Solenoid Relay

The Durakool mercury switch is used on this Type A solenoid relay. Steel shell enclosing chamber contains mercury and liquid fill, which insures maximum initial contact, prevents oxidation, quenches the arc and washes away impurities. Furnished in 10 and 20 amp. non-inductive load capacity, on 115-volts a.c. Made in normally open or closed construction. The 10-amp. rating Type A relay with mercury switch also furnished in single or double pole or in single pole double throw type. G-M Laboratories, Inc., Chicago, Ill.



G-M LABORATORIES RELAY

Rubber Socket Seal

This rubber socket seal has been developed for use in conjunction with lamp bulbs and sockets. It prevents entrance of certain foreign particles into space between lamp base and socket. Lamp end of the socket seal is feather-edged so that the seal fits snugly around the lamp bulb base. These seals are packed 25 to the box. Fostoria Pressed Steel Corporation, Fostoria, Ohio.

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We also furnish standard cutout and junction boxes with hinge or screw covers in all shapes and sizes.

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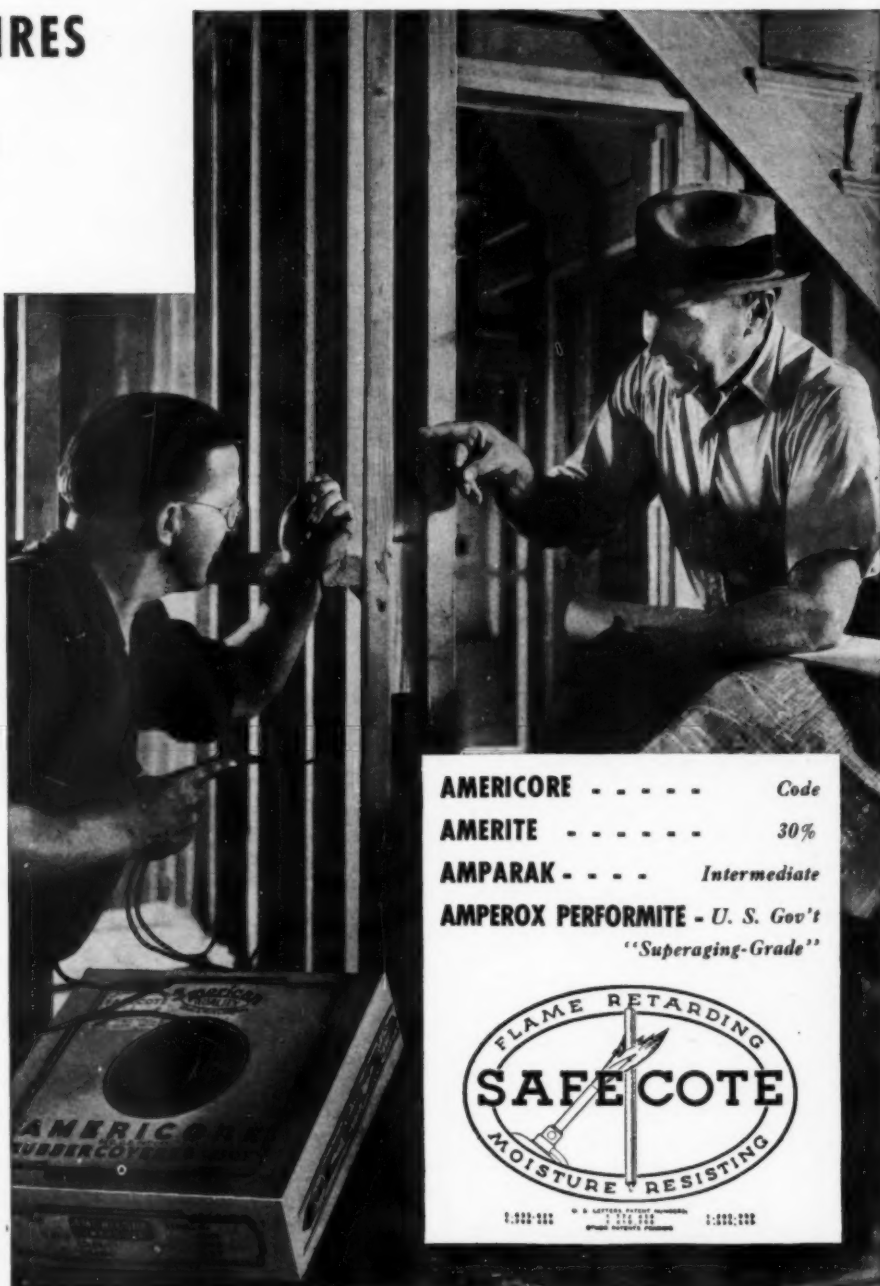
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These wires are available in all standard colors. To fully demonstrate their safety, economy and ease of handling, we will be glad to send you samples of these wires on request. Write for our complete, informative catalog on Building Wires and Cables.



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ELECTRICAL WIRES *and* CABLES

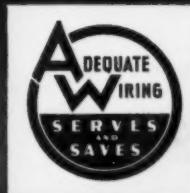
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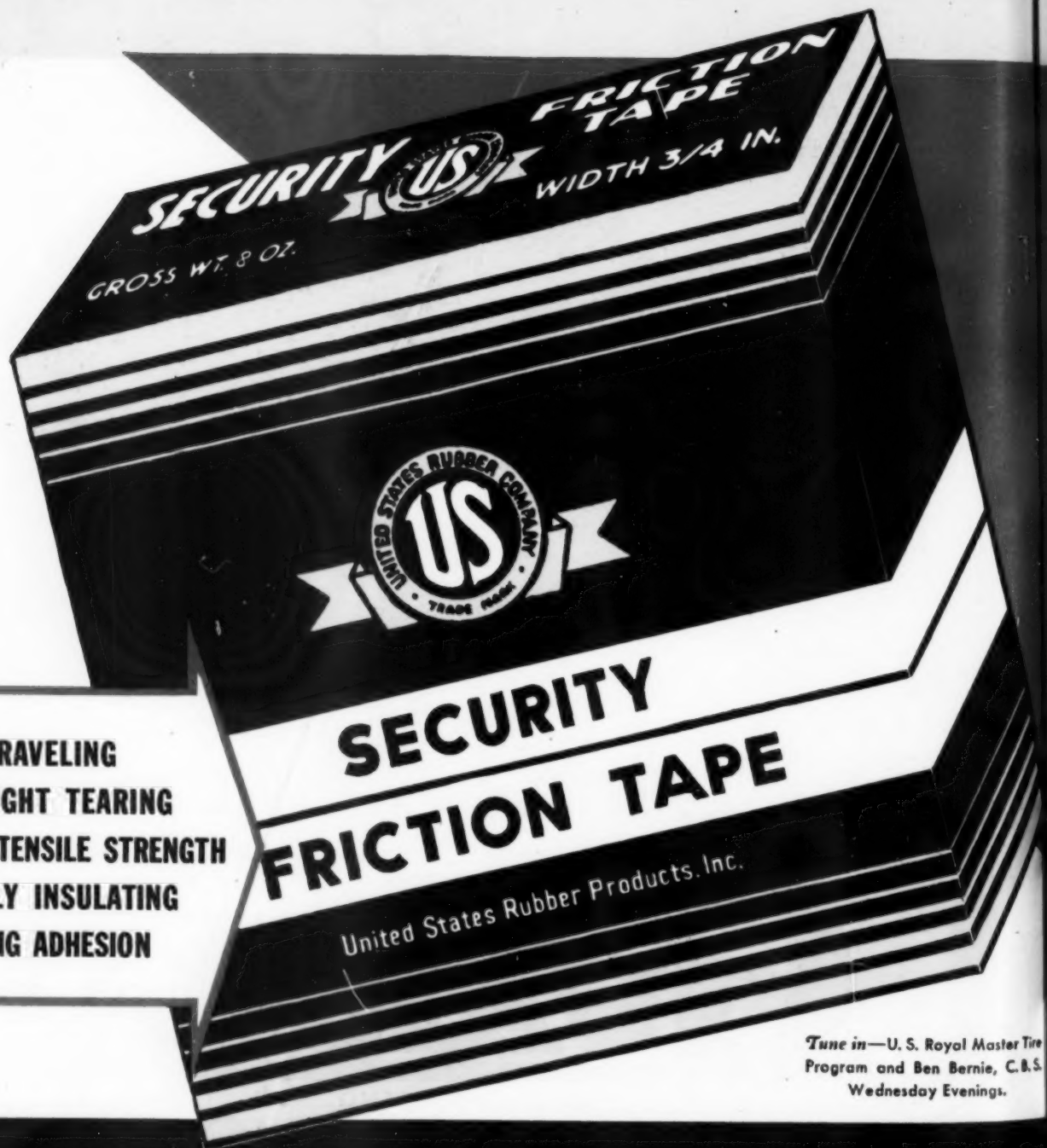
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